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Engineer Memoirs

**Lieutenant General
Carroll H. Dunn**



US Army Corps
of Engineers®



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Engineer Memoirs

LIEUTENANT GENERAL CARROLL H. DUNN

U.S. Army



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Foreword

This is the eleventh publication in the *Engineer Memoirs* series of career interviews. The series contains the selected recollections of major figures in recent Corps history. These memoirs lend important perspective to decisionmaking, now and in the future. By making these recollections available, the series preserves and shares the knowledge and experience of retired Corps officers and civilians.

Carroll H. Dunn had a distinguished career in the United States Army, which culminated with his two-year tenure as the director of the Defense Nuclear Agency from 1971 to 1973. In his earlier assignments he commanded the 105th Engineer Combat Battalion in the European Theater during World War II and was the executive to the Chief of Engineers. He headed the Directorate of Construction, Military Assistance Command, Vietnam, and the Directorate of Military Construction, Office of the Chief of Engineers. His last assignment with the Corps was as Deputy Chief of Engineers. I recommend this interview to thoughtful officers and civilians of the engineer family.



JOE N. BALLARD
Lieutenant General, USA
Commanding

The Interviewer

Paul K. Walker is the chief historian, U.S. Army Corps of Engineers. He received a B.A. from George Washington University and a Ph.D. from the University of North Carolina, Chapel Hill. He has been an Army historian since 1978. His publications include *The Corps Responds: A History of the Susquehanna Engineer District and Tropical Storm Agnes* (1978) and *Engineers of Independence: A Documentary History of the Army Engineers in the American Revolution, 1775–1783* (1981). He has also published articles on canal construction in the United States, Revolutionary War engineering, and the early history of Baltimore.

Acknowledgments

Dr. Barry W. Fowle, director of the oral history program of the Office of History, Headquarters, U.S. Army Corps of Engineers, was responsible for publishing this manuscript. Marilyn Hunter, also of the Office of History, provided editorial and technical support.

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Carroll Hilton Dunn

Carroll H. Dunn was born in Lake Village, Arkansas, 11 August 1916. He earned a bachelor of science degree in mechanical engineering from the University of Illinois, Urbana, Illinois, in 1938. He was commissioned a second lieutenant in the Regular Army by professional examination 1 July 1938. His first assignment was with the 8th Engineer Squadron, 1st Cavalry Division, Laredo, Texas. In February 1941 he was assigned to the Engineer Replacement Training Center, Fort Leonard Wood, Missouri.

In November 1942 he served the 30th Infantry Division as division engineer and concurrently battalion commander, 105th Engineer Combat Battalion. He remained assigned to this division through training at Camp Blanding, Florida; Camp Forrest, Tennessee; and Camp Atterbury, Indiana, and deployed overseas to England. From June 1944 to May 1945 he participated with the 30th Division in combat in Europe, going from Omaha Beach to Magdeburg, Germany. He was wounded by an enemy mine in the attack of Saint Lo, and spent two months in a hospital in England, returning to join his unit for the final drive into Germany.

In July 1945 he was assigned to the 2d Infantry Division as Assistant Chief of Staff (G-4), a position which he held until May 1946 when he was sent to the State University of Iowa, Iowa City, Iowa. He earned a master of science degree in civil engineering in June 1947, then taught combat engineering at the Engineer School, Fort Belvoir, Virginia.

From October 1949 to August 1952 he was assigned to the Engineer Section, General Headquarters, Far East Command, where his principal duties were staff supervision of the construction activities.

He returned to the United States in August 1952 and became the director of the U.S. Army Waterways Experiment Station, Vicksburg, Mississippi, a principal research facility in hydraulics, soils, and concrete. He continued in this assignment until July 1955, when he was sent to Washington, D.C., to become the executive officer to the Chief of Engineers, an assignment he held until August 1958 when he was selected to attend the Industrial College of the Armed Forces, Washington, D.C.

Upon graduation he went to Thule, Greenland, as the area engineer, and was responsible for construction of facilities for the nation's first ballistic missile early warning system. Returning to the United States in July 1960, he joined the newly organized Corps of Engineers Ballistic Missile Construction Office at Los Angeles, with the dual position of deputy commander and director of the Titan II missile system construction.

With his nomination for promotion to brigadier general on 18 January 1962, he was reassigned as the division engineer of the U.S. Army Engineer Southwestern Division, Dallas, Texas, effective 1 March 1962. In that assignment he was responsible for a construction program exceeding \$300 million per year. Among the many construction projects under his supervision were the Manned Spacecraft Center at Houston, and the \$1.2 billion program to improve the Arkansas River for navigation, flood control, water supply, and power.

On 1 August 1964 he was assigned to the Eighth U.S. Army in Korea as deputy chief of staff until 17 January 1966 when he was reassigned to Vietnam to assume directive control of all Department of Defense construction programs there. He served as Director of Construction, United States Military Assistance Command, Vietnam, until 30 June 1966.

On 1 July he became the Assistant Chief of Staff for Logistics (J-4), United States Military Assistance Command, Vietnam. In this assignment, he was responsible for coordinating all logistics support for the U.S. and free world forces in Vietnam, essentially assuring that the materiel, equipment, and transportation needed to support combat operations were available. He continued to hold this position until 15 September 1967.

On 16 October 1967 he was assigned as Director of Military Construction, Office of the Chief of Engineers, Washington, D.C. In this position he was responsible for military construction within the Army and for construction and design work performed for the Air Force, the National Aeronautics and Space Administration, and other government agencies. He was also responsible for the Army Nuclear Power Program and specialized fallout shelter engineering support for Civil Defense. The work assigned to the directorate totaled approximately \$1 billion a year.

General Dunn was appointed Deputy Chief of Engineers on 1 August 1969. In this position, he was the principal assistant and advisor to the Chief of Engineers in coordinating and supervising the worldwide construction, real estate, and mapping and geodesy responsibilities of the Corps of Engineers and in monitoring all Army military engineer matters.

Lieutenant General Dunn became the director of the Defense Nuclear Agency on 2 August 1971. He was responsible for the management of defense nuclear weapons testing, nuclear weapons effects research program, and nuclear weapons stockpile. He also provided staff advice and assistance on nuclear weapons matters.

He was a member and later chairman of the NASA Aerospace Safety Advisory Panel from 6 February 1968 until he retired from the Army on 30 September 1973.

On 1 October 1973 General Dunn joined Consolidated Edison Company of New York as Vice President/Construction. In September 1974 he became Senior Vice President/Construction, Engineering and Environmental Affairs. He retired from Consolidated Edison in August 1981.

On 1 May 1980 on leave of absence from Consolidated Edison, he began work as the full-time project director of the Business Roundtable's Construction Industry Cost Effectiveness Project. He retired from these activities in 1988.

The College of Engineering at the University of Texas has established the Carroll H. Dunn Endowed Graduate Fellowship in Engineering. Also, the Carroll H. Dunn Award of Excellence is given by the Construction Industry Institute to individuals who make significant improvement in the construction industry.

He and his wife Letha moved to Pinehurst, North Carolina, in August 1981 and to The Fairfax near Fort Belvoir, Virginia, in 1996.

In February 1998, General Dunn was elected to membership in the National Academy of Engineering.

Personal Data

Date and Place of Birth: 11 August 1916, Lake Village, Arkansas

Parents: William L. Dunn, Sr., and Ruth Dewey Dunn

Marriage: Letha E. Jontz, Moline, Illinois, 11 November 1939

Children: Carolyn D. Dean, Carroll Hilton Dunn, Jr.

Education

University of Illinois (B.S. in Mechanical Engineering), 1938

Command and General Staff School, Seventh General Staff Class, 1942

State University of Iowa (M.S. in Civil Engineering), 1947

Industrial College of the Armed Forces, 1959

Promotions

Second Lieutenant	1 July 1938
First Lieutenant	9 September 1940
Captain	11 October 1941
Major	27 June 1942
Lieutenant Colonel	30 April 1943
Colonel	13 August 1952
Brigadier General	10 April 1962
Major General	1 August 1966
Lieutenant General	1 August 1971

Career Summary

July 1938 to February 1941

8th Engineers, 1st Cavalry Division, Fort McIntosh, Texas

February 1941 to July 1942

Engineer Replacement Training Center, Fort Leonard Wood, Missouri

July 1942 to November 1942

303d Engineer Combat Battalion, Camp Butner, North Carolina

November 1942 to May 1945

Division Engineer, 30th Infantry Division and Battalion Commander, 105th Engineer Combat Battalion, Camp Blanding, Florida; Camp Forrest, Tennessee; Camp Atterbury, Indiana; England; and Europe

May 1945 to July 1945

Commanding Officer, 1153d Engineer Combat Group, Le Havre, France

July 1945 to May 1946

Assistant Chief of Staff, G-4, 2d Infantry Division, Camp Swift, Texas, and Fort Lewis, Washington

May 1946 to June 1947

Graduate Student, State University of Iowa, Iowa City, Iowa

July 1947 to July 1949

Instructor, Engineer School, Fort Belvoir, Virginia

September 1949 to August 1952

Engineer Section, GHQ, Far East Command, Tokyo, Japan

September 1952 to June 1955

Director, U.S. Army Waterways Experiment Station, Vicksburg, Mississippi

July 1955 to August 1958

Executive Officer to the Chief of Engineers, U.S. Army, Washington, D.C.

August 1958 to June 1959

Student, Industrial College of the Armed Forces, Washington, D.C.

July 1959 to July 1960

Area Engineer, Thule, Greenland

August 1960 to February 1962

Deputy Commander, Corps of Engineers Ballistic Missile Construction Office, and Director Titan II Construction

March 1962 to July 1964

Division Engineer, U.S. Army Engineer Division, Southwestern, Dallas, Texas

August 1964 to January 1966

Deputy Chief of Staff, Eighth U.S. Army, Seoul, Korea

February 1966 to June 1966

Director of Construction, U.S. Military Assistance Command, Vietnam, Saigon, Vietnam

July 1966 to September 1967

Assistant Chief of Staff for Logistics, J-4, U.S. Military Assistance Command, Vietnam, Saigon, Vietnam

October 1967 to July 1969

Director, Military Construction, Office of the Chief of Engineers, Washington, D.C.

August 1969 to July 1971

Deputy Chief of Engineers, Washington, D.C.

August 1971 to September 1973

Director, Defense Nuclear Agency, Washington, D.C.

Awards

Distinguished Service Medal with two Oak Leaf Clusters
Silver Star
Legion of Merit with one Oak Leaf Cluster
Bronze Star Medal with two Oak Leaf Clusters and a V-Device for Valor
Department of Defense Commendation Ribbon
Army Commendation Ribbon with two Oak Leaf Clusters
Air Force Commendation Ribbon with one Oak Leaf Cluster
Purple Heart
French Croix de Guerre avec Palm
Belgium Fourragere

Service Medals

American Defense Service Medal
American Campaign Medal
World War II Victory Medal
Europe-Middle East Campaign Medal with five Campaign Stars
Korean Service Medal
UN Service Medal
Army of Occupation Medal, Germany
Army of Occupation Medal, Japan
National Defense Service Medal
Vietnam Service Medal with three Campaign Stars

Engineer Memoirs

LIEUTENANT GENERAL CARROLL H. DUNN

U.S. Army



Lieutenant General Carroll H. Dunn

Lieutenant General Carroll H. Dunn¹

The Early Years, 1916 to 1934

Q: I'm somewhat less familiar with your early years than with some of the other people's because you didn't go to West Point. But I do know that you were born in Lake Village, Arkansas, on 11 August 1916. I was wondering if you could tell me a little bit about Lake Village and your early pre-college years there.

A: Lake Village is a small town, at that time (1916) around 1,200 to 1,400 people; the county seat of Chicot County. It is located in the southeast corner of Arkansas. One side is bounded by the Mississippi River, which is the boundary between Arkansas and Mississippi. The other—the southern side—forms the joint boundary between Louisiana and Arkansas. It is an agricultural community primarily, with very fertile, alluvial soil subject to overflow from the Arkansas and Mississippi rivers in the early days. Its chief feature was a lake that at one time had been a bend in the Mississippi, which, probably around 1500 or thereabouts, had been naturally severed from the river. It became a natural lake. As I remember it, it was the largest so-called natural lake in Arkansas.

My father was basically a farmer, though he did other things through his life. I was the second of four boys (one died in infancy) born into the family. We lived in Lake Village for several years, and then about 1917 moved to south Mississippi, which had been the original home of both my parents when they were married. We lived there until early 1920, when we moved back to Arkansas. The remainder of my life prior to going to college was spent in that community. All of my attendance at grade and high school was in Lake Village, where I graduated from Lakeside High School in 1934.

Q: You said that your father was in farming and other pursuits. Beyond that, was there any military service background in your mother's or father's family?

A: A younger brother of my dad served in World War I as a private and corporal in the infantry. And, as I understand, my great grandfathers on both my mother's and father's

¹Dr. Paul K. Walker conducted this tape-recorded interview with Lieutenant General (Ret.) Carroll H. Dunn in Washington, D.C., and New York City. The interview took place in April and July 1981. Both General Dunn and Dr. Walker edited the transcript. The original tapes and unedited manuscript are in the Research Collections, Office of History, U.S. Army Corps of Engineers, Alexandria, Virginia.

side were in the Civil War. My mother was a Yankee born in Iowa. She moved to Mississippi when she was about four, in the late 1890s. Her father had been in a farm accident in Iowa and had lost his left arm. He found that the weather was too severe, and so moved the family south to Centreville, Mississippi, about 1896. Both she and my father were residents of that area of Mississippi.

Q: Lake Village was a pretty small town. What were some of the main interests that you had as you were growing up?

A: Well, in terms of life events that are significant: I started school in 1922, first grade, and in January of 1923 I was severely burned. As a result I was confined at home for several months because of third degree burns on my back and arms. I recovered and was told later, when I appeared for my first physical as I was coming into the Army, that I would not be accepted because anyone with scars that heavy was bound to have physical impairments. Fortunately, I was able to convince them that I didn't, and it was not a major problem. I still, of course, carry the scars of that burn. Because of this I really had to learn to walk again after more than two months in bed. Nowadays I'm sure they wouldn't keep someone in bed that long, but in those days they thought idleness was the desirable thing.

Then in 1927, I remember very vividly the flood on the Arkansas and the Mississippi, the lower Mississippi River. I was in the fifth grade, and we had gone to school. The river was very high. There was much concern, and around 9:00 or 9:30 in the morning, word came through the school that the children should be dismissed. The levee had broken on the lower Arkansas River near its juncture with the Mississippi, and they anticipated flooding. We went home. I lived about three miles from the school, and I remember that evening watching the water rise in the back of our place. The next morning the lake and the flood water were one and we were totally flooded. My mother was just recovering from an operation, and she and we three boys went by skiff and small outboard motorboat for about six miles until we reached high ground. We went the next five miles or so on a railroad handcar, and then caught a train to go to my grandfather's in Mississippi, the original home. We crossed the Mississippi River at Vicksburg on the last train that ran before the water got so high that it was impossible for trains to run. They crossed on a ferry at the time. My early life was heavily influenced by what was one of the major civil works activities of the Corps. It was the Jadwin Plan, which was developed in 1928 for control of floods on the lower Mississippi River. Whether or not that really had anything to do with—certainly it didn't at that time, but later may have had some influence—my coming into the Army—I'm not sure. Maybe a little later we can get into that aspect of my career.

I did participate in extracurricular activities in high school. I played football. I weighed all of 155 pounds, which was not significant for a football player, and beyond high

school I did not engage in any such sport. But that and track were extracurricular activities in high school.

As I said, Lake Village is primarily a farming community. I grew up working on a farm. I mowed yards and delivered magazines to earn money. Dad, being both a farmer and entrepreneur of one kind or another, was always looking for things that might bring in some additional income. One of the things he did in the early 1930s, as the plan on the lower Mississippi to raise the levees along the river developed, was to work with a contractor planting Bermuda grass sod on the levees as protection against erosion. One of the jobs that I had during the summer as a sophomore and junior in high school was taking a crew and planting sod on the levee in the area near Lake Village, and also in Louisiana across from Vicksburg. So, again, there was a connection with Corps of Engineers' activities at a relatively early age.

Q: And you were aware of the Corps' presence at that time?

A: Oh, yes. The Corps was very much an activity in that alluvial valley of the river, and was one of the employers of people that had a very well-regarded name.

Q: How did the locals view the Corps?

A: It was a very desirable organization for which to work.

I also became aware of the Waterways Experiment Station at Vicksburg, since I worked in the Vicksburg area in 1933 after my junior year in high school. I had visited the lab not too long after it had been formed in 1929 by General [Herbert D.] Vogel. I was aware of some of the hydraulic model studies from this early time. And, again, while at the time I don't think I was aware that the Corps was weaving a web around me, there were these connections at an early age. They certainly gave me some knowledge of Corps' activities when the time came to consider whether or not I might join it.

Q: Beyond the positive local attitude toward the Corps as an employer, what about attitudes toward the flood control activity itself?

A: Very, very, very supportive in general. There was one aspect of the Jadwin Plan that involved a floodway to protect the Mississippi side that went down through Chicot County, which was something that those on the Arkansas side were violently opposed to, and it never did come about. I read over some of the congressional hearings in later years. Though I was vaguely aware of them at the time, I really didn't know all of the details about the hearings and other testimony. When I discovered later some of the things that had gone on, and that the floodway was part of the plan, I knew why they

were so violently opposed. In general, however, the Corps was well received in the area, very well thought of, and is still so today.

Q: In 1933 when you were working in Vicksburg, how did the Depression affect your family?

A: Very severely. Dad, in addition to trying to do farming, also tried to do other activities. He managed some farming interests for others. He at one time was manager of a cotton gin. At other times, as I indicated, he did sodding work on the levee job, and so forth as a matter of making ends meet. I can remember the times very well. And while we never suffered physically, there was always the question of whether there was going to be money enough to get by. We always had a garden, raised vegetables. We always had a few milk cows so that we could have our own milk and butter. We had chickens for eggs. In large measure, we were self-sufficient for food.

University of Illinois, 1934–1938

Q: You went to the University of Illinois, where you started in September 1934. Before entering there, how did you become interested—

A: Why did I go to the University of Illinois?

Q: Well, first of all, you were the second child. Had your older brother gone to college?

A: Yes. First, maybe I better go back. I mentioned four children. My youngest brother died from the results of an automobile accident when he was only five months old. He was in the car with my father, lying on the front seat of the car. They didn't have baby seats in those days. A truck came out of a side street in front of Dad, and he was not successful in an attempt to avoid it. The car was hit, turned over, and the baby was fatally injured. So that, in reality, there were only three boys remaining. This was in 1924. I was about eight at the time.

Going back to the question of college, as I grew up, while our family was not in a position to do much about college education, Mother and Dad always had in mind that we three boys should get a college education. More than anything else, I think, they instilled in us the idea that this was the thing that we should do and that everyone should work toward that end. They had attempted to save money to help, but the little money put aside was lost in the Depression by a bank closing. And so, while they had given us a very strong desire and anticipation that we would go to college, the means were somewhat limited.

There were several reasons for my going to the University of Illinois. One, I had always had a mechanical aptitude. I had done the usual working on cars, things of that sort, worked around farm machinery. And I had had some encouragement. Dad had always felt somehow, and I don't know why, that mechanical engineering was a good thing for me to do. My grandfather (my mother's father) was very ingenious and on their farm in Mississippi had developed a number of things. He had dammed up a creek and put in a small hydroelectric plant so that they could have electricity back in the early twenties. He had taken the engine block of an old Ford car engine and built it into a pump. He dammed another creek and put in a waterwheel and, using this block as a pump, had running water at their dairy barn and at the house. He had also developed a sawmill. So I think primarily from him I inherited an inclination toward engineering and mechanics.

Q: You saw these things when you—

A: I spent nearly every summer for about four years from about 8 to 12 with my maternal grandfather and my uncle, who worked with him. I'm sure that at least indirectly this influenced my movement toward engineering and probably toward mechanical engineering, although there was no formal background that would lead me to do this. But I decided early that I wanted to take engineering.

That being the case, my feeling was that employment and opportunities were probably better in the North than in the South. Realizing this, just as the Depression was on in the early thirties, made going North to school somewhat attractive.

Second, in actual fact, it was about 520 miles from Lake Village to Champaign, Illinois. It was about 400 miles from Lake Village to Fayetteville, the location of the University of Arkansas. The difference was the railroad. The I.C. Railroad ran up the east side of the Mississippi River, and it was easier in those days to get to Champaign than it was to go over 400 miles of gravel road to go to the University of Arkansas. That was a second, though secondary, consideration.

The real consideration was the fact that my mother's elder sister lived in Champaign, Illinois, and she was there primarily to assist her children in getting an education. When my older brother two years before, in 1932, decided to go to college, our aunt took him in and assisted in getting him started. When I came along, he was able to line up a place for us to live in the home of one of the chemistry professors (chemistry being his specialty) where we had a basement apartment. In return, I put in about 14 hours a week working at their house and yard, taking care of their car, and so forth. This gave us a working opportunity. And my brother had a job in the chemistry library where, as I remember, he made something like \$20 to \$25 a month. This was what we used to buy food. So we "batched." This developed the capability for us to have a place to stay

and food. The only other things needed were books and tuition money. These basically were the reasons why I went to the University of Illinois. This arrangement lasted for two years until my brother graduated. It worked out very well.

As a matter of interest, the total amount of financial help my parents were able to give me was somewhere between \$200 and \$300 in the four years, most of which was in the first year.

Q: Do you remember what the tuition was back then?

A: Tuition was \$250 a year for out-of-state students.

Q: So you had to do something else to get that money?

A: Well, throughout my four years, I worked during the summers. After my older brother graduated, I moved to a rooming house. I waited tables in a sorority for my meals. During my senior year, I had a job under the New Deal program called the National Youth Administration [NYA], and I worked in the materials lab at the university for one of the professors. The actual work was in stress corrosion of steels. This was also a part of the work I did for an undergraduate thesis. Then I borrowed some money from the university program. So summer work, work during school, and minimum borrowing with a small amount of help from my parents provided the opportunity for a college education.

Q: And so your major emphasis from the beginning was on mechanical engineering?

A: Engineering with mechanical as the basic program.

The Choice of a Military Career, 1938

Q: Now, it's interesting to me that very shortly after you graduated from the University of Illinois you began a military career as a result of a professional examination. I was wondering then how this came about.

A: I was in the ROTC program at the University of Illinois for four years.

Q: You had a Corps of Engineers unit in the ROTC?

A: In the ROTC at the University of Illinois, there were infantry, field artillery, coast artillery, engineers, signal, and cavalry.

Q: And because of your major field, that sort of—

A: That tended to put me in the engineers. My going into the Army revolved around the fact that in 1936, after the flood on the Ohio River of that year, Congress in its civil works legislation passed a bill to enlarge the officer corps of the Corps of Engineers—as I remember it—by 108 officers. My memory is that the number of officers already in the Corps in midyear 1936 was on the order of 600 to 700. In passing this legislation, my understanding is that Congress felt not only that there was a need for additional Corps officers, but it was also desirable that some of them have an engineering background in civil life. So they set up this program for the enlargement and specified that 72 of the 108 would be engineers who had engineer degrees in civil life. The remaining 36 would come from increased quotas for West Point graduates.

It was established that 72 would be taken in increments. The first increment, I believe, of 18, was commissioned in February 1937, the second increment in September 1937, and the third increment of 36 was taken in 1 July 1938. During my senior year (in late 1937 or early 1938), the senior engineer officer with the ROTC at Illinois announced that this opportunity was available and strongly encouraged me to apply. The encouragement was so strong that, more to get him off my back than anything else, I did submit an application as did one other officer at Illinois. As I remember, in January or February of 1938 the application went in. This involved both a physical exam and a professional exam. The professional exam was in two parts, one verbal before a board of officers and the other a written examination. There was also a provision that, if I met certain criteria, I could accept a fixed grade on the written portion of the exam and be exempt from the actual examination.

The question was whether there would be enough people taking the exam and making a higher grade score so that there wouldn't be any vacancies left if I took the exemption. That was the risk that I took. My understanding is that there were about 1,800 nationwide who took the examination for the 36 vacancies. The criteria for exemption, as I remember, was to be in the upper 10 percent of one's class, to be recommended by both the Dean of Engineering and the senior engineer ROTC officer, and possibly grades or activities. Anyway, I chose the exemption route. Frankly, part of the reason was that I still wasn't certain that I really wanted a commission in the Army, but I was going ahead because of the strong urging of the Professor of Military Science and Tactics.

At the same time I had been fortunate in job interviews. Jobs were still scarce in 1938. I had interviews with Caterpillar Tractor Company, General Electric, and International Harvester. I remember at least those three; there were possibly others. Actually, I had accepted a job with the Caterpillar Tractor Company to go to work on the 5th of July 1938 in an outstanding program. I would be an engineer trainee at the magnificent

starting salary of \$125 a month under a two-year program. The \$125 a month was for the first six months, then \$145 for the second six months, and about \$175, as I remember, for the second year. This was one of the most attractive programs offered to seniors at the University of Illinois at that time.

Q: They were based in Illinois, weren't they?

A: They were based in Peoria. As a comparative thing, the offer which I got from GE in the same type of training program was \$60 a month to work in Schenectady, New York. While I had applied for an appointment in the Army Corps of Engineers through this program, I was also actively pursuing civilian employment. I felt that what I really wanted to do was industrial production. I was very attracted to the Caterpillar program and, as I say, had accepted their offer without knowing what would result from the application to the Corps.

I also had been scheduled to receive a Reserve commission as a second lieutenant through the ROTC program. I had planned to go to summer camp as soon as graduation was over in late June, and to do my two-week tour and therefore be exempt from additional camp requirements for five years. This was the program at that time for those in the Reserves. I planned to get this out of the way and then go to work for Caterpillar early in July. That was my plan.

I graduated in early June and went to Camp Custer, Michigan, shortly thereafter (about mid-June). While I was at Custer, in late June, I got a telegram from the War Department that said I was offered a commission in the Corps of Engineers Regular Army effective 1 July. So my problem then was to decide whether to go into the Army or go to work for the Caterpillar Tractor Company. It was a major decision. I had met my wife-to-be at the university. The fact is we had started going together in the spring of my freshman year.

Q: You are referring to Letha Jontz?

A: Letha Jontz from Moline, Illinois. She had graduated ahead of me and was then working for International Harvester Company in Indianapolis, Indiana. As a part of my attempt to make up my mind, I got on the train and went to Indianapolis to meet with her. Airplanes not being available in those days, it took some time. But we had a meeting of several hours to discuss the alternatives. I remembered my experience as I had seen the Corps operate in the lower Mississippi Valley area. I also talked very seriously with the Professor of Military Science and Tactics from the University of Illinois, who was also at camp.

Q: Do you remember who he was?

A: His name was [Charles J.] Taylor. Also, I talked with the junior officer among the regular engineer officers who were at Custer with whom I had a little better rapport, a graduate in the class of 1930 named [Robert B.] Lothrop. Incidentally, he was a prisoner and died during World War II, having been captured in the Philippines. But, also, in late 1938 it was clear that war clouds were forming, and I began to believe that there was a fairly high probability that we could be engaged in war activities. If so, as a Reserve officer, I would probably be affected. From the point of personal involvement, if that were the case, I would be better off being in early as a Regular officer. That, together with what I knew of the Corps' activities from my experience in relation to it, led me to believe that, while I might not under normal circumstances choose a military career, the opportunities in the Corps together with then present conditions did influence my decision. After talking it over thoroughly with my wife-to-be, we decided that I would accept.

Of interest, as I compare it with personnel practices today, was the fact that they not only wouldn't tell you where you were going on your first assignment until after you had made a commitment, but you also had to agree to pay your own way to get to the first assignment. They didn't offer as many incentives as they do today, but still there was a great deal of competition for the vacancies, so they were able to call the shots.

I sent a response accepting a commission, wrote the Caterpillar Tractor Company that I wouldn't be arriving for employment on the 5th of July, and then came my first problem with the Army. This was completed about the 27th of June. The camp was just about over, and I was supposed to go back to Champaign, pack up my things, and get ready—I thought originally to go to Caterpillar, but now to go into the Army (I knew not where). Unfortunately, the adjutant of the camp, an infantry major, was about as bureaucratic as you could get. Somehow he decided that, even though the original telegram said that I would have 13 days to report to my first station, I couldn't leave Camp Custer until I knew where I was to go. He wouldn't allow me to go back and pack up my things. He kept me at Camp Custer until the 9th of July when I finally found out I was going to be assigned to Fort McIntosh, Laredo, Texas, about 1,500 miles from Camp Custer. Now I had to get there at my own expense, having wasted nine days while I sat cooling my heels waiting on the Army to tell me where I was going, and waiting on a major to make a more enlightened decision!

Anyway, the orders came, and not knowing how I was going to get to Texas and realizing that I had to go by Champaign, Illinois, I made a deal with a Corps of Engineers captain who was one of the instructors at the camp, Charles H. McNutt (whom I later ran into a number of times). For \$60 I bought a 1930 Buick that he had at the camp. I set out for Champaign to pack my things, then to Indianapolis to say goodbye to my wife-to-be, to Arkansas to see my folks, and headed for Texas to be there in four days. I made it. The car performed reasonably well, and I rolled into Fort

McIntosh on the 13th of July, the temperature approaching 100 degrees, with no air conditioning, to a place that appeared to me to be the end of the earth—south Texas along the Mexican border! That was the beginning of my career in the Corps of Engineers.

Q: You got yourself to Laredo, Texas, but there are just a couple of things I was going to ask you before we went on. When you made this decision to go into the Corps of Engineers by professional examination, having been offered and turned down a job, did you have any idea about how long you might be in the military at that time? As it turned out, it was your life-long career.

A: Having decided to go into the Corps and to accept the appointment as offered, there was never any intent in my mind for other than a full career. I can remember that shortly after being in the Corps I saw published an annual list of officers of the Corps and their assignments. And I believe that my order of rank on that list was somewhere in the order of 710 or 720. Having been number 15 in 36 of those who came in on July 1st, I had a few people junior to me, but very few. At the time, they also used to publish your anticipated retirement date based upon retirement at age 64. I remember very vividly my retirement date was forecast to be August 1980, which seemed to me to be in the very distant future. No, there was never any intent on my part to have other than a lifetime career, and I anticipated that I would serve until my retirement date.

Q: Did your wife-to-be have misgivings? Was she from a military family or was this going to be a new thing for her to be the wife of an officer?

A: She had no relationship or experience with the military whatsoever. Her father was an engineer with the International Harvester Company. At the time we were married, he was chief inspector of the Indianapolis works, where they made truck engines. She had no background in the military, but took the position that, if that's what I wanted to do, she was willing to go along. I might add that when it did come time to retire she was more reluctant to leave than



Carroll and Letha Dunn, 11 November 1939.

I. She had enjoyed very much the relationships in the military: the people we knew, the friends we had. She found it to be a very satisfying experience, although certainly trying at times, including separation during World War II, during the Vietnam conflict, and at other times when I was overseas. But she became a very strong military wife.

Q: Did you have any feelings when you entered that you were at a disadvantage since you weren't a West Pointer? You mentioned that a larger number came in at that time, as you did, from civilian colleges. But was there a feeling of distinction, of being set apart from the officers who came the West Point route at this stage?

A: That was one of the things that had bothered me as I was trying to decide what to do I talked about it at considerable length with Lieutenant Lothrop. He convinced me that this was not a matter that I had to be particularly concerned about. So other than to consider it, it never was an issue.

As you indicated, there were a fair number who came this route. There were also others who received a commission through what was called the Thomason Act, in the late 1930s. Then shortly after, as we began to mobilize for World War II, of course many, many more officers came on active duty. I can say in all honesty, I had no feelings whatsoever in my 35-plus years of service that the fact that I was not a West Pointer was in any way a detriment, or could I point to anything that was adversely affected by that fact. Some of my best friends are contemporaries who were from West Point, but many other friends are not West Pointers. It was not a problem in any way, shape, or form.

8th Engineer Squadron, 1st Cavalry Division, Fort McIntosh, Laredo, Texas, 1938–1941

Q: Were those of you who came in through this route ever together at any time? You said you didn't know where you were going and you described going directly to Texas, so I guess at that point at least you weren't together with the other officers.

A: We were not together at all, and they were sent, in effect, all over the world. There were some places where more than one was present. It happened that Roy Dodge and I ended up at Fort McIntosh, a post with a very small unit called a squadron, in effect a three-company battalion. It was called a squadron because it was a part of the 1st Cavalry Division, the 8th Engineer Squadron. Roy and I were both assigned there, and Ernie [Ernest C.] Adams—who had come in the September 1937 group—was also. In reality, there were three of us at that one station out of a total of, as I remember, 17 or 18 engineer officers.

Q: You were there until 1941, I believe.

A: I was there from July 1938 until February 1941 except for a period of about five months when the unit was either in the field on maneuvers in west Texas or temporarily stationed at Fort Bliss, Texas, in the fall and winter of 1939 and early 1940. Then we moved back to Fort McIntosh.

Q: And what kinds of things was the squadron doing at Laredo?

A: They were engaged in the normal training activities of a unit. I remember doing bridge training on the Rio Grande River using a bridge that was invented for use in the Civil War, and that is absolutely factual. The floats or pontons were frames with canvas covers, to be portable. If we happened to get the bridge too far out from the bank, we were quite likely to hear shots from the Mexican side. One of our training activities was to be prepared to react to any Mexican raid along the border.

We probably were one of the more fortunate engineer units as far as training in the field. Money in those days was very scarce. The 1st Cavalry Division was spread along the border from Fort Bliss at El Paso to Brownsville on the Gulf, and we would have field training with the various elements of the division. One activity in the spring of 1939 was to go to west Texas with a platoon to make a reconnaissance map, which was used during division maneuvers in the fall of that year. One of the main requirements in that open country was to plot fences and gates because the cavalry division was mounted on horses. The restrictions on the use of land under easements was that we couldn't cut fences, so our maps had to show all the gates. The cavalry then knew where to head for, to get around and go through the fences. Windmills were a major landmark, and they had to be plotted on the map. I also went with a platoon for some antitank training at Fort Sam Houston, San Antonio, with the 2d Infantry Division. The 2d Engineers (their organic engineers) were at Fort Logan, Colorado, and that was too far to bring people for training at Fort Sam. We were only 150 or so miles away, so we got into training with the 2d Infantry Division as well as with the cavalry division. So even in those days in the late 1930s our unit spent a great deal of time training in the field.

Q: Normally that would have been a combat engineer regiment that would be with the infantry, as opposed to the squadron with the cavalry, right?

A: Yes. One of the things we did in the summer, being a motorized unit in a horse division, as a part of our training, was to go on a motorized hike, as we called it. This covered about 1,000 miles all in the state of Texas in the period of two weeks. We trained in motor movement and camping, etcetera, all over south Texas. I think it was very good training and was also somewhat of a vacation for the troops. We also made motor movements to west Texas as a part of our activities. So, as a unit, we probably got as much, or more, field training in those days as did any unit of the Regular Army.

Those were activities that kept us busy. We also tried to do some experiments ourselves. I remember trying to devise an antitank mine. I used a wooden box with TNT explosive and for a detonator, a blasting cap. I devised a means by which, if something ran over it, the cap would be sheared and explode. We also did other experiments with explosives to devise ways to make antitank obstacles by blowing craters. We had a very active organization, relatively small in number of people, but very active in training.

We also had the annual rifle fire training. When we were in the field with the cavalry, one of our major activities was to find locations for watering points and to operate them to water the horses. In west Texas, that's not an easy task.

We went on maneuvers in 1940 in east Texas and western Louisiana in what later became the area of Fort Polk, Louisiana. We were there before there were any military installations. Those came later as mobilization took place for World War II.

Q: There was a debate going on about the role of engineers with the mechanized cavalry. I don't know how much you recall about that, but from this we have the formation of the armored division. So you stayed with the cavalry right on until you went to Fort Leonard Wood?

A: Actually, I went to Fort Belvoir first, and then to Fort Leonard Wood.

My first experience with the mechanized cavalry came about in the Louisiana maneuvers in 1940. The 8th Engineers were there as part of the 1st Cavalry Division. It was the first attempt at mobilization of a large part of the Active Army. A part of our job had been to prepare the area for maneuvers, including reconnaissance and minimal base camp. One event that stands out in my memory involves the first mechanized unit. I was a young second lieutenant. There was a bridge across a stream in western Louisiana that had been severely damaged in a flood. One of the piers had been displaced; and in repairing it, instead of fixing it for full load, the state highway department had come in and built it up using some short lengths of wooden piling on top of a tilted pier. We had looked at it and decided that it was severely restricted in capacity and had set a load limit of ten tons for any vehicle crossing it. The squadron commander, or my company commander (I don't remember which), had left me there with a few men purely as a precautionary safety measure, not as a part of the exercise. My orders were to prevent any U.S. military from using it for a vehicle that exceeded ten tons.

While we were there, a unit came up that happened to be the 1st Mechanized Brigade under Brigadier General [Adna R.] Chaffee, Jr. I stopped them and wouldn't let them cross because they had some vehicles that exceeded ten tons. General Chaffee was very

upset that this young lieutenant would refuse to let him cross. One of the things he said to me was, "Have you talked to Captain Clarke about this?" He referred to General Bruce Clarke, who was the company commander of the engineer company with the mechanized brigade. I told him I hadn't seen Captain Clarke but that I was fairly certain that there was a very high likelihood of a disaster if heavier loaded vehicles used this bridge. We could not afford to risk the safety of the military or damage to the state bridge, and therefore I couldn't allow him to cross. And he didn't cross. That was the first experience I had with the mechanized cavalry.

Q: When I interviewed General Clarke, he referred to these exercises and saw them leading to the establishment of the armored division. They demonstrated the advantages of mobility and engineer support?

A: There's no question. Of course, I wasn't in a position really to have any influence on that. I would say that my own experience showed me the real problems that were involved in the use of horse cavalry in any type of warfare that we were likely to be engaged in in Europe. The movement into armor was a move in the right direction to accomplish the things that in olden days had been the responsibility of the cavalry in wide sweeps or deep penetrations. The time of the horse was coming to an end.

Q: And you saw this at the time?

A: Yes.

Q: And so you probably didn't feel you'd be involved with the cavalry for that long?

A: This was my first assignment. It wasn't a forever assignment. It had to change.

Q: I think, too, in 1940, Paul Thompson, I don't know if you recall this name, was a captain who was brought back to OCE [Office of the Chief of Engineers] and was writing on the role of engineers in combat and the German blitzkrieg. And, as it's been said, his writings, many of which were published in some of the engineer journals, were influential in this movement. And beyond that, I mentioned before the debate on the general role of engineers in combat that was going on at this time.

A: I was not a part of that. When I was transferred from Fort McIntosh, it was to become a part of what was to be the engineer training center at Fort Leonard Wood, Missouri. We were gathered together at Fort Belvoir along with the cadre who was to make up the other training center at Fort Belvoir. After arriving at Belvoir, through the acquaintance of another officer who was assigned to the Office of the Chief of Engineers, I first met Paul Thompson. This would have been in February of 1941. I don't remember any detailed discussions on the question of the role of the engineers in

Germany and in the German blitzkrieg specifically, but, of course, was aware of the preparation for possible war and the mobilization. As I recall, he [Thompson] had recently returned from Germany, where he had taken some advanced engineering studies and had also become fairly well acquainted with German activities. He was in the intelligence group in the Office of the Chief of Engineers, as I remember it, at the time.

Army Training Center, Fort Leonard Wood, Missouri, 1941–1942

Q: So you went to Belvoir. That was your first time there as part of getting ready to go on to Leonard Wood. Belvoir training center opened somewhat earlier, in February 1941, I believe. Then it was in May of that year that Fort Leonard Wood training center opened.

A: Yes, we went to Belvoir to get together as a headquarters because construction was not completed at Leonard Wood. It happened that, of the Regular Army officers chosen to make up the cadre for the training center, I was the only lieutenant in the group. We had not yet had a general officer designated to be the commander. The deputy commander, who was the active head of the organizational group putting together the training center, was Daniel Noce. He decided that my duties were to be as an aide for the commanding general when he was finally named. In the interim, I served as assistant adjutant in putting together the organization of the training center, and we moved to Leonard Wood in late April or early May, as I remember. And about that time, Brigadier General Ulysses S. Grant III, grandson of the original, was designated as the commanding general. I became his aide, but still continued as assistant adjutant.

We found my activities, in addition to being an aide, very interesting. General Grant lived at Leonard Wood. My wife and I, married less than two years, lived in Rolla, Missouri, the nearest town in which we could find a place. As General Grant traveled around Missouri, where his grandfather was well known, people were always glad to have him speak and attend events. Both my wife and I usually accompanied him. He took a very great interest in both of us, and we became quite familiar with Missouri at that time and with activities of his grandfather as they were remembered by people of Missouri of that day.

In addition, I had the job of being the “staff judge advocate” of the center. We had none assigned, and it became my duty to review various special court and other court cases (we did not have general court martial jurisdiction) and to make recommendations for the general’s action. In setting this up, I remember I looked through the replacement trainees who were coming through and found a couple of lawyers from civilian life who

were draftees. I brought them into the office to be the actual legal reviewers for me. That was just one of my special functions in my job as assistant adjutant.

I was also involved in issuing daily orders and things of that sort, as well as the more routine administrative activities. General Grant was very strong on being in the field, seeing what was going on in training. This he did in addition to traveling around the state of Missouri and neighboring states as a part of community activities.

Q: Did you continue that relationship with him?

A: Yes, we continued contact even after his retirement, until he died here in Washington a number of years later. After he left the training center (in fact, I left the training center before he did for my next assignment), he came to Washington and was active as head of civil defense in the Washington area.

Q: At Fort Leonard Wood officers were coming from a variety of sources because of the mobilization and the shortages of getting them from traditional sources like ROTC. Where were they coming from?

A: Mostly from some type of Reserve or National Guard appointment. The officer candidate training had not started at the time. It came along a little later.

Q: Do you recall any specific problems?

A: There was a relatively small cadre of Regular officers in addition to the commanding general and deputy commander. There was a training group of more senior Regular officers in charge of developing each particular phase of training. The senior commanders down to battalion commanders were all experienced Regular officers. The officers coming in, primarily from call-up of Reserves and National Guard, became the company commanders, the platoon leaders, the battalion staffs and, gradually, as they trained on the job, began to take over more and more of the senior positions. My memory is that the system worked fairly well.

They were organized into two groups, and each group had a number of battalions. In those days there was separation of the races; one group was black and one was white. The white group, being the larger group, had more battalions than did the black group, but the training and the activities were the same. As to the source of officer commission—at least in my experience—I have no strong memory of any major problem as people came in and were absorbed into the activity. There was a fairly heavy turnover, and before a year was over a larger number of the Regular officers had been sent out to other assignments and activities. Many who came in as captains had gone out as majors to command new battalions that were being formed around the country.



Lt. Col. Carroll Dunn inspects a foot bridge during training at Camp Blanding, Florida, 1943.

303d Engineer Combat Battalion, Camp Butner, North Carolina, 1942

As far as I can remember, of the younger officers—that is, those with less than ten years' service who came to Leonard Wood in early 1941—I was the last to go. I went to Fort Leavenworth, Kansas, to a special 13-week course in early 1942. It was called the Seventh General Staff Class. Shortly after I graduated from Leavenworth and returned to the training center as the adjutant, I was ordered to Fort Belvoir for a month's divisional staff training course for engineer officers. I then went to Camp Butner, North Carolina, near Durham as the battalion exec of a new unit being formed, the 303d Engineer Combat Battalion of the 78th Infantry Division. The battalion commander was a son of an ex-Chief of Engineers, Edward M. Markham, Jr.

105th Engineer Combat Battalion, Camp Blanding, Florida, 1942

We arrived at Camp Butner in early July 1942. There was a delay in sending in fillers, but we spent the time training the cadre of the battalion. After I'd been there about five months, I was ordered to Camp Blanding, Florida, in November of 1942. One of the assistant division commanders of the 78th Infantry Division, Brigadier General (later Lieutenant General) William K. Harrison, had been transferred to the 30th Infantry Division at Camp Blanding. He had known me in the 78th as the exec of the engineer battalion. When the division commander of the 30th Infantry Division wanted to find another battalion commander for the engineer battalion of the 30th, apparently General Harrison remembered me and recommended that I be transferred. That, apparently, as near as I can find out, was the reason why I was picked out and ordered to Camp Blanding to be the new battalion commander of the 105th Engineer Battalion of this National Guard division drawn from the Carolinas and Tennessee. It had been called to active duty and then cadred a number of times; that is, people moved out from that



The undefeated 105th Engineer Battalion baseball team, Camp Blanding, Florida, won the 30th Division championship, 9 May 1943. Lt. Col. Carroll Dunn stands upper left.

division to form other new units. When I joined the battalion in November 1942, there were just over 100 people in the battalion, with many vacancies in all grades because of those assigned to other cadres. The division had now been designated to be filled up, relieved of any further cadre requirements, and placed on a very heavy program of training.

It was at this time that a change in battalion commanders was made, and I came in as a major to command the battalion. From just over 100 people when I arrived, in less than a month we had 1,000 in the battalion. We started training the battalion from individual through squad, platoon, company, and battalion training beginning 1 December 1942 and ending with maneuvers in Tennessee in November 1943. This provided about one year of very intensive training before movement of the division overseas. The decision that this unit would be trained as a division was very helpful in providing protection from calls to move people out to other units. The movement overseas finally took place in February 1944, when the unit went to England to be a part of the forces to go into Europe in June of 1944.

Q: I want to backtrack a little bit to Fort Leonard Wood because there's been some indication in histories of the period that there were complaints from the European and Pacific theaters about the inexperience of officers and troops that were coming out of the replacement training centers. Did this all have to do with the rapidity of the mobilization and the type of training? The admissions requirements were changing; the amount of course work that was required was changing. But one of the areas that was mentioned was that people didn't have enough training in operations and maintenance of construction equipment. This fact is mentioned in one of the Army's World War II histories, *The Corps of Engineers: Troops and Equipment*. The volume states that the engineers came to a point where they realized that a lot of training was going to have to come through experience after they left because there just wasn't time to do this.

A: My answer is that it is probably true. My own experience doesn't exactly cover that. The training center at Leonard Wood had a very specific mission. It did not include specifically the training of officers other than those assigned there, and, by getting involved in the training activity, they would get on-the-job experience. It in no way served as an officer candidate school, which was held at Belvoir.

Second, there also was a very limited activity in training as far as equipment was concerned. We did train draftees, as a part of their course, to be operators of certain engineer equipment. We were not prepared to train mechanics. Leonard Wood's mission really didn't cover the things that you've indicated here; there simply wasn't time. My memory is that we had 9 to 11 weeks to train draftees before they went out to new units, and it was anticipated that the specialist training would come later. There certainly was no opportunity for anything other than performing the fundamentals of

an engineer soldier: bridging or pioneer work. A draftee learned to become a soldier first—to shoot and to live in the field—with minimal training to be an equipment operator on some of the relatively simpler types of engineer equipment. It was very, very basic training designed to take people off the street and to make them soldiers in a very short period of time.

Q: How successful was it?

A: Well, I have no real way of judging. In terms of the mission we were given, my feeling is that we turned out a product that was in keeping with that mission in the time given to do it. I was in the headquarters and not directly involved in the training, but I recall that most of the people who were engaged in the training felt that there wasn't sufficient time to do the things they really needed to do. There was always the question of how do you get the necessary skills and knowledge that have to be taught to make a soldier out of a raw recruit in such a short period of time. There was no time for any advanced individual training. The best we could really do was some semblance of training to platoon level. Nothing more than that.

I do think the experience would indicate that it is necessary to set up a more advanced course for training mechanics and skilled equipment operators and other specialists. In the time period available for basic training, there simply wasn't any time for advanced training. It could have been done there if people had been kept longer, but in the time frame given it was not possible.

Q: Were you involved in any postwar assessment of the mobilization effort?

A: Other than being assigned as an instructor at the Engineer School from 1947 to 1949, responsible for the engineer combat portion of the advanced course for officers where we used wartime experiences as background as we prepared lesson plans and taught them, I had no part in any formal evaluation of World War II.

Q: Can you think of any other experiences in the period before your departure for England that you would like to recall?

A: One of the things that impressed me as a young officer occurred at Fort McIntosh. After I'd been there about two years (this would have been in the fall of 1940), a new commanding officer came in, Lieutenant Colonel Wilhelm D. Styer, who later became chief of staff of the Army Service Forces under General [Brehon B.] Somervell. I remember Colonel Styer telling our group of young Regular officers, "I'm not really trying to train you to be lieutenants and captains; I'm trying to train you to be battalion commanders." As far as I know, every one of those 10 or 12 lieutenants and young captains became battalion commanders later in the war. He foresaw the need. And less

than two years from the time that he was talking to us, I was a battalion commander. I have thought many times about this statement of his. Here was a man who probably had spent 15 or 17 years as a lieutenant or captain; yet he had kept the mission of the Army in his mind. And, as he saw mobilization beginning to take place, he knew there was going to be very rapid promotion with increased responsibilities for the young officers with very little service. His job was to be sure that we understood in this small unit what it meant to be a battalion commander of 700 to 1,000 men.

This experience stayed with me. At Leonard Wood, in certain officers who were there, I also saw this same degree of looking ahead and seeing what the mission was. On the other hand, at Leonard Wood there were among those officers sent there as a cadre some who had retired on the job a number of years before. Even as a young lieutenant, it didn't take me very long to decide who were the officers who were going to be effective during the war and who were the ones with very little imagination or notion as to what it was all about. In the very small Regular Army, clearly, among the officers with whom I came in contact in the Corps of Engineers, there were some who had vision and knew what they were doing and others who had to be goaded and led around and hadn't had an original thought for years. I very quickly realized both were there. It became necessary (and while I had nothing to do with it), I saw, to replace these people because they weren't the ones who had the qualifications to be training new people.

At that time there was a forced retirement from the Army of some officers, even as we prepared for war. These officers were removed from the service because they simply didn't have what it took to be effective in a wartime situation. This was not limited to the Corps of Engineers. It was an Armywide thing for which the Corps furnished a few candidates. It was an early experience in knowing that there comes a time when you have to be willing to make a choice of who has the capability and who doesn't. I found it very intriguing that in the midst of preparation for war this action was taken to eliminate from the officer roll those who by experience, training, or initiative didn't appear to have what it took to go ahead. I would assume that this was an action by General [George] Marshall as the chief of staff who recognized there had to be some elimination of dead wood. While there probably were some individual injustices, in general, I thought it showed remarkable foresight in terms of the importance of being sure that the people who were in charge of training were qualified, not only by experience, but also by attitude and initiative to do the work.

England, February–June 1944

Q: What was your feeling, then, as you sailed for Europe in 1944? You knew that you were going to England with the 105th Engineer Combat Battalion as the commander,

and you were going to be with the 30th Infantry Division. How much did you know about what you were preparing to do?

A: Very little, really, other than we would be a part of any invasion when it took place. Certainly, even as battalion commander, I didn't at that time have any idea when the invasion would be. I knew that we were part of the buildup in England, that we would complete our training in England, and that somewhere along the line we would be a part of the invasion force.

Looking back, I was assigned at a relatively early age as a battalion commander, in November 1942 with just over four years of experience. I had been promoted to major in June 1942, and I felt a tremendous responsibility in being given a battalion to train. I felt very strongly what Colonel Styer had told us about our responsibilities. I felt that I'd had as good a background as anybody could have. Having served in the 8th Engineer Squadron with very active training and much field work, I felt this served me in good stead. It was with a sense of great responsibility and anticipation, yet of necessity, that I joined the battalion. I felt that having a full-strength unit with a year to train it gave me an opportunity to do the job. Also, I had a good group of officers who worked with me to do it. In my mind, when we sailed for England, we were ready for combat.

When we got to England, we emphasized more than anything else in our training what we knew from the North African campaign—the importance of mine warfare. Of all the preparation we did in England between our arrival at the end of February and the time we went to the continent about the 10th of June, mine warfare training was most important. My feeling was that since we were about to go into combat, we had to do something besides train with dummy mines.

Q: You had experience with that?

A: Some.

Q: In Texas.

A: Yes, in the early days I had used my own ideas on how you could make mines since we didn't have any available for issue. So I devised a training program—

Q: Now when was this?

A: In England—to train people to handle mines. We started out with dummy, or inert, mines, and had a record kept of each trainee as he progressed through increasingly difficult mine training. As we found people who psychologically or emotionally simply

could not handle it, we removed them from the training program. After first handling—including planting and finding dummy mines—we started using live mines, although not activated, to plant and to find. We had a few German mines and used these also. We kept up this training so that at graduation each man who lasted through it and appeared to have the emotional stability to do it had to pass the final exam, which was to remove a buried live mine that was booby trapped with a pressure release device and a quarter pound of TNT. In other words, this was a lethal thing. It didn't make sense to me to have people training with dummy or inactivated mines when, in a few weeks, they were going to be in combat.

Of the men in the platoons and line companies, as I remember it, somewhere between 300 and 400 passed that final exam. There was one training accident in which one man was killed when he started to deactivate this device and, through some means, whether from carelessness or some other reason, it exploded. In my own view, this was extremely tragic. Nevertheless, for the group as a whole, in order to prevent more casualties during combat operations, it was essential that we train people to be capable of removing mines in combat. Just about the time we finished this training program, someone in the theater headquarters got the idea that training accidents were verboten and forbade the use of live mines in training. I think this was one of the most unwise training directives that I've ever heard of under the circumstances. It would have made sense back in the United States as people were starting their training, but here we had people (with D-Day just a matter of weeks away) who would be in France working in a very heavily mined area (from all the intelligence reports). I saw, as one of the primary missions of this battalion, the need to remove mines. I could not bring myself to take these people into enemy minefields without the psychological training of having dealt with live mines in their training.

This was the training program that I developed as a battalion commander. I don't know how many other people used it. I was astounded when the orders came out from headquarters that we could not use live mines in training. I think it was a very short-sighted view. I don't know who was responsible for it, but I was delighted that we had completed our training before this came about and with only one casualty. I am absolutely certain we saved many lives when we faced the real thing.

Q: Do you think the order was a reaction to your accident?

A: We weren't the only ones, but I suspect that ours had a part. But the training proved that we had people who had a respect for mines but were not afraid of what they had to do when they went into combat. Of all the training innovations for which I was personally responsible, I really believe that this was one of the most effective. As I say, we didn't keep people in it if we saw (of course, we weren't psychologists, but the officers were very careful to observe people) that they lacked the psychological

capability to face the task. We simply removed them and made a note of it, and we kept this information as we went into combat.

Of course we did bridge and other training that we could do with limited capability and space available in England. We got our equipment ready to go. Our unit was one of those that went in on what was called the “first turnaround” of shipping after the invasion. We were not involved in the actual D-Day, but we went in about D+5 or D+6.

Q: The battalion journal, I think, listed it as June 13th.

A: It could have been. I went in two days ahead of the battalion with an advance crew of the division.

Q: I wanted to ask you about the “capable” officers you had serving with you in the battalion. Were you referring to people like [Major Antonin M.] Sterba?

A: Sterba was a Reserve officer, as was [John A.] Allison, who was the B Company commander, then became the S-3.

Q: [Oakes] Hayden?

A: Hayden was the battalion S-2. I had only one Regular officer, a young lieutenant named [Edmund H.] Leavey, a West Point graduate of 1942. He did not stay with the battalion long. I believe he was reassigned before we actually went to England. But the battalion officers were either National Guard or Reserve officers. They had, for the most part, been with me during the training of the battalion in the States and had basically done a very, very good job.

Originally, Sterba had been the S-3, and Major [Joseph F.] Kulas had been the battalion exec. Kulas was moved out to command a battalion on his own, an exception to the plan that we wouldn't be raided, in order to give him a chance for promotion and also to best use people with experience. Sterba became the exec and Allison—and again I don't remember whether this was after we got to England or not—moved from B Company commander to S-3.

Q: I think the journal will show the time development of some of these events.

A: Yes. It was a unique opportunity to take a battalion from the start of training of a brand new set of recruits, through a year's individual, squad, platoon, company, battalion, and division maneuver exercises as a unit. I think this was an outstanding example of the right way to train a division and all of its components for a military operation. How

many divisions had that opportunity, I simply don't know, but ours did. I think it paid dividends because the unit was a cohesive unit when it moved to England and when it went onto the continent. Certainly my feeling was that the engineer battalion was ready. During maneuvers in Tennessee, we had had the individual line companies of the divisional battalion work and train with the appropriate infantry regiments in the basic combat team component. The regimental commander knew the company commander of the engineer battalion, and he thought of him as one of his own. Even though we went through this exercise, companies were not attached; they were in support and remained under my command. But there wasn't any real problem; any of the regimental commanders would have fought just as hard for the engineer company as they would for one of their infantry companies. They were a part of a team, and that worked well as we went on into France. For the most part, each line company supported the same regiment backed up by the battalion headquarters and the headquarters and service company for support as needed.

Q: I wondered if you had any observations or impressions of England during the period that you were there prior to landing in France—of the people and the British military.

A: I had relatively little direct contact with the British military. We were located in a one-battalion cantonment that had been provided by the British. Primarily, we continued our own training of both individuals and small units. We also continued with the planning involving the 30th Infantry Division as a part of the invasion into France.

As to contact with the English people, there was some. The impressions that I have are of a friendly people who were appreciative of both the reason why we were in England and the planning for the invasion. They seemed to go out of their way to make us welcome. To be specific, and purely as an example, I remember a couple who lived near our camp. He was a retired barrister, very badly crippled by arthritis. They had a small country place nearby. They made it a



Lt. Col. Carroll Dunn in Dropmore, England, just before D-Day, 10 May 1944.

point to become acquainted. Personally, I had several contacts with them. They invited my adjutant and me to play bridge on several occasions when we had a chance to be away, and I believe I had Sunday dinner with them at least once.

There were other activities, more general in nature, to welcome the men of the battalion. Nearby, the Astor estate, Cliveden, sponsored some activities to which battalion personnel were invited. The small communities nearby would often invite a small group for some social function.

One thing I noticed was that the English were quite restricted in the availability of many items of food. The only fresh vegetables I remember were Brussels sprouts. I got very tired of Brussels sprouts. Cakes were usually made from a very strong wheat flour and with very little sugar available. Nevertheless, they shared what they had.

Moving ahead a little bit, but to give you some idea of the English food: I remember very vividly that about four weeks after we landed in France our rations included the first American white flour that had been issued. At the same time, some toilet paper from the United States was issued. I really had a hard time deciding which was most appreciated—bread made from American white flour or toilet paper that didn't have the wooden splinters that the British brown paper had! All this is to say that the British shared what they had. They accepted the overloading of the island with troops and equipment. It was very crowded, yet the relationships were good.

Q: One of the main things your battalion was engaged in while training in England was mine clearing. Earlier you talked of your insistence on using live mines as part of that training. After your unit got to France, landed in Normandy, how much use were you able to make of that training? How heavily mined was the area? Did you feel that the training turned out to be adequate?

A: The area into which we went, behind Omaha Beach, was very heavily mined. And the mine problem was really our major problem for the first several weeks—together with the problems of trying to move through the very heavy hedgerows of the Normandy countryside.

There's no question in my mind but that the training in England, which accustomed the troops to dealing with live mines, psychologically prepared them when they actually got in combat. I have no way of proving this other than the fact that the men readily accepted the assignments given, and we had relatively few casualties from mines that could be blamed on mishandling. There were mine casualties. I was one of them, actually, but this had nothing to do with attempting to remove mines. That mission was handled very, very well.

This success continued throughout the war in France. When we moved into Germany in the fall of 1944, we became involved in the defenses in and around the Siegfried Line near the border of Germany. Mines, both antipersonnel and antivehicular, again became a major problem.

Q: Another activity that the unit would have been frequently engaged in was bridging. There was some training in this, too, in England, isn't that correct?

A: Yes, although our unit, as a part of an infantry division, did not have the same degree of either training or capability as existed in, say, an armored division. We did train with bridge units. We did considerable training with relatively short sections of treadway bridge for hasty bridge emplacement. This paid off in the early days in Normandy in allowing our vehicles and troops to cross some of the canals and relatively narrow watercourses that we found.

We also trained with foot bridges and other types of expedient bridging, which were the primary things that we would be called on to use. Any major bridging requirement meant that we were reinforced by corps engineer units. They provided the bridging for any major water crossing, the first of which was the Vire River.

Q: Was it Bailey bridging?

A: Not so much Bailey, although in a few cases we used them. More often than not, treadway-type vehicular bridges were the best solution.

Omaha Beach to Saint Lo, France, June 1944

Q: How much did you know about the enemy that you were meeting before you landed in France; about the kinds of weapons they used, etcetera?

A: The general information, I think, was fairly good. We had good intelligence on German units. However, we found after we got to France that many of the units were made up of older people and, in some cases, very young people. In many cases, there were what I would call impressed people from other nations who were added to the German units.

The 30th Infantry Division, of which we were a part, actually came in as a part of the elements arriving on D+6 on Omaha Beach. Our first major mission was to clean out a section of the front, along the Vire River, starting about six to eight miles inland from the beach and continuing to the area of Saint Lo. We were engaged from the time of the landing (about 13 June) until late July.

Q: From the landing to Saint Lo?

A: Yes.

Q: So, you do feel, then, that your intelligence was generally good?

A: I think it was good. We also had some very good geological and geographical intelligence that was very useful for determining characteristics of the terrain, location of bridges, and locations of streams and their characteristics. This was very useful in preplanning; and, for the most part, I found it to be fairly accurate and indicative of the general situation.

The information we had in the early days of the invasion was very good. As the movement speeded up after the breakthrough, we tended to outrun the available intelligence, and mapping information was more of a problem. But, at the same time, the need was not as great because the movement was much faster.

Q: The journal for the 105th Engineer Combat Battalion makes frequent reference to how the 105th was involved in instructing the infantry in such things as use of flame throwers. I was wondering if you could comment on the role of the engineers as instructors to the infantry.

A: The method of engineer operation, for the most part, after the first week to ten days following the invasion, was with each one of the three line companies directly supporting one of the infantry regiments of the division. For that reason, the engineer battalion really operated quite dispersed—A Company with the 117th Infantry, B Company with the 119th Infantry, and C Company with the 120th Infantry. They maintained that relationship throughout the campaign.

That meant that the company commander was almost a part of the regimental staff. The regimental commanders became very well acquainted with the company commanders and often called on them, not only for assistance in doing the engineer work, but also for help in training their pioneer platoons and other units, when occasion allowed, in those activities that were essentially of an engineering type.

This meant that the engineering capability of the unit could be extended by this training. The regimental commanders thought very highly of their engineer units and became very possessive of them. Actually, I had no real problem on that score, and I welcomed the close association. They were not officially attached to the regiments, but the regiments looked on them as a part of their operational team.

That left the battalion headquarters and the headquarters company as the general support for all of the line companies. That also meant that since the line companies were dispersed, working with individual regiments, I spent a major portion of my time actually operating as the division engineer at division headquarters. I anticipated what would be the requirements for engineers, and also took part in the planning associated with G-3, primarily, but also G-2 and G-4.

Actually, this planning started with the initial movement into France. I was one of eight people who made up the advance detachment of the division going into France under the command of the division artillery commander, who was a brigadier general.

Q: At Saint Lo, you were injured, which required that you be sent back to England. You mentioned that your injury was related to a mine explosion.

A: Yes, but first some background. In the breakout at Saint Lo, which really was the breakout from the hedgerow country of Normandy, an attempt was made to assist the breakout by a massive air bombardment. This bombardment was scheduled and partially took place. Then, for reasons that I'm not sure of at this point, it was called off and rescheduled for late July.

When the attack was launched, our plan as one of the principal divisions to make the breakout, had advance infantry units supported by armor and engineers near the front lines. We tried quickly to break through the German lines closely following the heavy aerial bombardment. There were difficulties with the bombardment, resulting in a number of friendly casualties. As the bombardment took place, the smoke, dust, and debris in some cases obscured the terrain features that the Air Force was using for bomb release. It was at this time that General [Leslie] McNair, who was visiting the front, was killed in the 30th Infantry Division sector by our own air bombardment.

Because of the criticality of the operation, I had a platoon with each of the two battalions from different infantry regiments scheduled to make the initial breakthrough. Being concerned about the success of this, I personally went forward and was with one of the platoons as the last of the bombardment took place. We had actually started moving forward. As the last group of planes came over, they dropped their bombs short, straddling the road on which we were located.

Fortunately, it was a depressed road in that area and the detonations took place on each side of the road without any serious casualties to the group with which I was moving. I had had several trucks hit earlier in the bombardment and there was some disorganization. There were casualties among the infantry units, including, as I remember, at least one of the infantry company commanders with the forward element.

At any rate, because of the static nature of the engagement before the bombardment, we felt strongly that mine removal would be a principal activity, and the engineers were moving toward the front of the column. As they started forward, they became engaged by sniper fire. A little later we found a dug-in German tank that had not been hit by the bombardment. It had the road under observation and direct fire.

This stopped the forward movement and, because of the disorganization that had taken place as a result of the bombardment, things were somewhat less than satisfactory. I decided to make a personal reconnaissance to see if there was a quick way around the German tank. I left the road on which we were moving and got maybe 50 feet or so off to the side.

Since I was watching more for snipers than where I was putting my feet, I must have hit a trip wire and exploded a mine. Based on the results, the mine apparently was a homemade affair consisting of a tin can full of rocks with a quarter pound of TNT. It went off about two feet or so from my foot. It sprayed my left leg with small metal fragments and rocks. I was told later, when they recovered my boot, which was removed as I was being evacuated, that there were 50-some holes in it.

The explosion, of course, knocked me down and for a moment I'm sure I lost consciousness. Shortly thereafter I became conscious but was unable to move. My leg had been broken near the ankle. As a result, I was evacuated to a field hospital just to the rear of the division. They operated that night and several days later I was air-evacuated back to England.

Q: About when was this?

A: I can find the date, but it was somewhere about the 25th of July.

Q: It was the 25th of July.

A: I got back to the battalion in October.

Q: Or late September, which was indicated in the journal.

A: I can't remember. It was in the late September-early October time frame.

Q: How aware were you of what was going on with your unit while you were in England?

A: I kept track mostly through the *Stars and Stripes* and very limited correspondence. One of the advantages of being a part of a division was that its location was not classified.

Thus, it was much easier to keep track of exactly what the division was doing than if the unit had been part of a smaller organization.

Q: Did you expect to return to command?

A: Theoretically, I was classified as “seriously wounded.” Under normal circumstances I might well not have returned. But there was a request from the division commander to the hospital that I return as early as possible. I actually was returned as an exception to theater policy based on this personal request of the division commander.

Q: Who was he?

A: Leland S. Hobbs.

Q: Was there a particular reason why he requested you?

A: So far as I know, he and others on the division staff had assumed that I would be coming back upon recovery and release from the hospital. For that reason the command of the battalion had passed temporarily to the executive officer [Major Antonin M. Sterba], who served as the battalion commander during my absence.

Across France, 1944

Q: At what point did you rejoin the battalion?

A: I rejoined the battalion just after the American forces had captured Aachen and during the action to enlarge the penetration into Germany through the Siegfried Line. The division was then located about 15 miles north of Aachen on the boundary between Germany and Holland.

Q: Earlier, in addition to the mine activity that was an ongoing concern as far as the advance up to this point and beyond, you mentioned bridging and the type of bridging that you used. Were there any problems with bridging during your advance; problems with supplies or problems with the bridges that you were required to construct?

A: No, I don’t remember any to this point, but we had some interesting bridge problems a little later. During the Battle of the Bulge, we went south to the Malmedy, Belgium, area. After that was over, we returned to the original location northeast of Aachen and prepared to cross a small stream called the Roer River as a part of the general attack toward the Rhine. There were some interesting problems here. The Germans had opened the discharge gates from an upstream dam, which flooded the Roer in this area.



Brothers Lt. Col. Carroll Dunn, U.S. Army, and Capt. G. Raymond Dunn, 4th U.S. Cavalry, meet in a bunker near Aachen.

Q: They didn't blow the dam then?

A: Actually, we tried earlier to blow it by aircraft bombs but were not successful. To suit their own purposes and time, the Germans opened the gates and flooded the area downstream, very adversely affecting our ability to cross.

As I remember, in late February of 1945 we returned from the Battle of the Bulge to the same area that we had occupied in November and prepared for that attack across the Roer. The flooded area not only included the river and its flood plain but large drainage ditches on each side of the river. We also had to make provisions for getting across those ditches.

We did develop some temporary-expedient bridge that was light enough for the troops to carry that provided a foot crossing over these drainage ditches. Then we used the assault boats to get the infantry across the flooded area of the river. This was followed up by floating bridges built by supporting engineer troops so that we could get tanks and vehicles across. The next major use of bridging came in the crossing of the Rhine about a month later and considerably north of this area in the German plain north of Cologne.

Q: In the assault on the Siegfried Line, how effective was the air support that was given?

A: The actual assault took place before I got back to the unit, so I can't specifically comment. I know there was use of close air support through small flights attacking specific bunker areas. One of the things we did, after the capture of Aachen, was to spend some time blowing up the fortifications to prevent their being reused in case there should be a counterattack. In doing so, we experimented by shooting at them with large-caliber weapons to determine exactly what the effects would be. I don't remember any specific details, but I can say that they were extremely difficult to destroy.

Q: Do you recall hearing that there had been a problem with U.S. planes hitting Americans during the air assaults prior to that?

A: In my personal experience, on two occasions that happened. One was in France at Saint Lo, as I previously mentioned. The other was during the Battle of the Bulge when our unit went south to a position on the north flank of the Bulge in the Malmedy area.

We were definitely bombed by our own Air Force at the time we were moving into Malmedy because there were erroneous reports that the Germans had captured Malmedy. Actually, they never reached Malmedy itself but turned south instead. There was a lack of coordination, resulting in some destruction in that area from our own aircraft as our own troops were occupying this village.

Q: How did you find the German fortifications in general along the line when you got there?

A: In the Siegfried Line area, of course, the ground was well organized. The fortifications were well built and extremely strong. The primary weakness inherent in that type of fortification was the restricted visibility. The main means by which they could be attacked was to find the blind approach to reach and blow the door with shaped charges. The doors faced the German lines and were not susceptible to being hit by our artillery. We also used flame throwers and shaped charges in those cases where individual bunkers were occupied during the assault.

Q: There has been some feeling expressed that at that point the Germans were quite vulnerable (in late September–early October 1944) and that the war could have been won earlier, or certainly much more could have been accomplished than was. From your perspective, what would your observations be on that?

A: It's pretty hard to get an overall view from near the front lines even at the division level other than knowledge of what's generally being reported in the intelligence summaries, operational summaries, and in the *Stars and Stripes*. It was very obvious that we had

outrun our supply lines, and we were engaged in reorienting our supplies and developing a supply route from the Dutch ports. There had been the excursion into the Rhine plain in the Netherlands, which had further diverted supplies and efforts, even though not overly successful.

My own experience, as I returned from the hospital through the replacement system, had impressed on me the problems in the supply and transportation systems. I went through at least four replacement depots after leaving England, and finally ended in one near Etampes, about 15 miles from Paris. I was delayed there several days by discussions of whether I was medically fit to return to duty. I finally was allowed to leave.

My trip to the front was another experience. Thirteen hundred replacements were placed on a train made up of cargo box cars without any provisions for food and water other than cases of cold C-rations placed in each individual car. There were about 40 cars; and, as the train was being loaded, an individual came up to me and asked me to sign a paper. I asked him, "For what?" He said, "You're the train commander and these are the records which require a signature for this replacement group."

He had no roster of men in the group and said we were designated to go to another replacement unit somewhere in Belgium. The "somewhere" was literal. They really didn't know where it was but said we were supposed to be on the train about 24 hours. We actually spent 72 hours before arriving at Huy.

The major problems resulted from the fact that there were no kitchen cars and the train crew was French. There was no real information as to where we were or when we would get to our destination. For instance, we sat in the rail yards, in the outskirts of Paris, from about 8:00 at night until about 5:00 the next morning simply waiting for a train crew and a change of locomotives.

By that time, the water that individuals had brought in their canteens was somewhat low. I tried to make provisions for water as we finally began to move north. We came into Compiègne, where I had been promised some water. Sure enough, there were two tank trucks. However, there was no way to fill canteens other than through one oversized hose connection on the back of each tank truck. With some difficulty and considerable delay, we finally got several lister bags set up. This gave some opportunity during a relatively short stop to provide water, but it was a very unsatisfactory and disorganized performance.

Not long after I returned to the division, there was an IG [Inspector General] investigation of the replacement system, and it was changed to provide travel crews and

permanent kitchens and water cars on trains carrying troops. This experience certainly indicated that our advance had somewhat outrun our organized support system.

Q: Did evidence of this crop up again?

A: That is the major instance of which I was personally aware. One earlier time was on Omaha Beach after a major storm that occurred about the 16th or 17th of June, which had disrupted supply transfer over the beach. There were times then when things got a little short.

Q: After entering Germany, was there any sabotage of German industry that you recall?

A: I didn't see any signs that I could call sabotage. Actually, the breakthrough, with the bombing and artillery shelling, reduced the border villages to piles of rubble with very little industry actively working. Our division headquarters, for instance, was billeted in a building that had been a glider factory at an earlier date. Those portions that had escaped the bombing were perfectly usable. Utilities were out, both water and electricity, but there was shelter. Several mines in the border area had escaped damage. We found these very useful because the changing facilities at the mines were an opportunity for showers, including hot water, which was a very precious commodity at that time.

Q: Was there much equipment or usable material that was left behind by the Germans?

A: Not at this point because the movement had been too slow. Later, after we crossed the Rhine in early April 1945 and began the rapid advance across Germany, there were occasions when equipment and food were found. I remember, after capturing food storage warehouses, [we found] one had mostly cheese and another frozen strawberries. These obviously didn't last long and wouldn't have lasted long had they not been, shall we say, requisitioned. Spoilage would have occurred, since there was no electricity for refrigeration.

Q: What kind of general activity was the battalion engaged in after taking over each area?

A: After the initial breakthrough of the Siegfried Line, a major activity, as I have indicated, was destroying the pill boxes so they couldn't be reused. Another activity was enlarging the gaps through the tank traps that made up the line; clearing rubble to open at least a passable road that was later improved and enlarged by the supporting engineer group. We also carried on, where possible, some training with the infantry in preparation for further attacks to the east through areas near the border that had been mined previously. This basically was how we were engaged until the time the Battle of the Bulge started in mid-December.

The Battle of the Bulge, 1944

Q: Do you have any comment about the support that was given to [Courtney] Hodges' First Army, of which you were a part at this time? Was supporting [Bernard] Montgomery as opposed to supporting [George] Patton farther to the south a wise decision or not?

A: Since I was hospitalized from the time of the breakthrough at Saint Lo until after lines had pretty well been reestablished with the capture of Aachen, I don't have personal knowledge that would indicate one way or the other the actual distribution of supplies. My only knowledge would have come from reading the reports in the *Stars and Stripes* and other papers. By the time I got back to my unit, we were not critically short of fuel and other supplies. Nevertheless, as I've indicated, the supply lines weren't well established and only through such things as the Red Ball Express were we able to maintain the required ammunition and other supplies needed for the continued offensive.

Q: What was the reaction when things began to turn around and the Germans mounted their counteroffensive?

A: Well, the thing that I remember before the Battle of the Bulge was being in a relatively quiet sector making preparations for crossing the Roer River and further attacks to the east. We heard on the radio, both officially and unofficially, that a German counterattack had started in the Ardennes. It was only a few hours afterwards that we got orders to be prepared to turn our sector over to a mechanized cavalry unit, and to proceed south to stabilize the northern flank of German breakthrough. I left immediately to go to V Corps headquarters (to which we were being attached) to get further information and, particularly, a supply of maps for our units and to meet them as they arrived in the new area. So I was thus engaged during the first evening at a time when the movement of our troops came under fairly heavy German air attack. Actually, in my own war experience, it was probably the heaviest air attack that I experienced. It did disrupt, to a fair degree, some of our convoys. In some cases inexperienced drivers simply stopped their trucks and took off. The major problem was getting these people rounded up and keeping the traffic moving. Even with the disruption, we were able to get the maps into the hands of the units as their advance attachments arrived.

Our division moved in three columns into Malmedy and the little villages to the west of Malmedy along the north flank of the German breakthrough. One of the units (the 119th Infantry, to which B Company, 105th Engineers was attached) came head-on into one of the German columns and fought a very decisive battle in the vicinity of Stavelot and Trois Ponts, along the Ambleve River. This stopped the Germans in any

breakthrough to the north. However, they continued on to the west, where they were met by other units, which finally stopped the breakthrough.

This was one of the few times that we blew up bridges as a part of our defensive operation. On several occasions engineer platoon units had the job of blowing up some masonry bridges across that river as a part of their defensive position. We also used the First Army map depot, which was located at Stavelot, as a fortified position. The maps in bulk were a part of the protection as you would use sandbags or other material. Maps are pretty effective in stopping small-caliber bullets when they are in heavy packages.

Q: So you made do with what was available. Near the end of December 1944, the 30th Infantry Division became part of the XVIII Airborne Corps. Did this include the engineer battalion with them at that point?

A: Well, we were already in place when the XVIII Corps came in together with the 82d Airborne Division. We became a part of the corps on the north flank of the Bulge. We then participated as a part of the XVIII Corps in stopping the German penetration in that area and in the counterattack to close the gap. When the gap was reclosed, as I remember it, toward the end of January 1945, the division was transferred back from the XVIII Corps to the XIX Corps, which had been our basic corps unit through most of the war.

Q: What was the reason for that change?

A: The reason was purely the fact that we had been moved out of the sector that we had occupied, which was then the XIX Corps sector, and transferred from XIX Corps to the V Corps and then to XVIII Corps as it was brought in as a part of the reinforcing reaction to the Bulge.

Q: The actual official date for the change back was the 2d of February 1945, at which point the battalion journal recorded they felt that was good news because no one wanted to go back to the Siegfried Line assault again.

A: Yes, but remember that this unofficial journal basically was kept by the operations sergeant at battalion headquarters. Many of the comments are as he saw them, which I think is unique and unusual, but they may or may not always describe the official viewpoint.

Q: That's a good point. I was interested in what you thought about this comment. Were there any unique things about this experience that you'd like to comment on—the time when you were out of the XIX Corps sector?

A: The main events were influenced by the German counteroffensive. One thing that stands out was the very heavy use of aircraft on 1 January 1945, when the German air force essentially appeared for the last time. They really massed their aircraft in support of their operation. This resulted in one of the heavier air attacks of the war as far as our unit was concerned. We also were in the path through which the German V-1s or “buzz bombs” flew toward Antwerp. These often had malfunctions, and several fell in our area. The engineers had the problem of making repairs, cleaning up the debris, and protecting some major installations to minimize the possible damage. It was also winter—a very cold and disagreeable winter.

I would say that one of the things I remember is the fact that we really weren’t prepared with proper clothing for continued operation in that kind of climate. Later, in Korea particularly, better equipment and clothing for cold-weather operations were available. The cold and its effect on people were primary problems. We did put in a Bailey bridge. One of the few times that the 105th Engineer Battalion itself erected a Bailey bridge was as a part of our counteroffensive in the Battle of the Bulge. We had quite an exposed location and put in the bridge during the night in weather well below freezing with snow on the ground. This was an acid test of the training that our unit had in Bailey bridge erection. Although, as I say, most of this type of bridging was done by supporting corps units.

Finding mines in the frozen ground under the snow was the other big engineer problem. We tried using some of the mine-clearing devices with heavy rollers and flails on tanks as a means of exploding mines that we could not otherwise find. While in defensive positions along the northern flank waiting to begin the counterattack, we also developed a mine strategy for our division. On my recommendation, the division commander, over objections from some of the regimental commanders, decreed that all defensive mines would be emplaced on a temporary basis with no booby traps used. This made it necessary to cover all minefields with small-arms fire but was dictated by the fact that we anticipated going over to the offensive soon.

We recognized ahead of time the problems that would be encountered in our attempts to get through our own minefields and the casualties that would occur as we began the offensive. We felt it was worth giving up a little bit on the defensive in order to be able to move more rapidly forward once we began the counterattack. I believe that this was a wise move, and it did pay dividends when we went on the offensive.

Q: What would account for the problem of not being prepared for the cold?

A: This is purely my opinion, but I think that we really just hadn’t developed our cold-weather gear to the point where we were prepared to support major ground units under these conditions. We obviously had wool uniforms, which were the normal wear, but

the field jackets and overcoats that were issued were really not the answer—field jackets were good fighting clothing but didn't provide sufficient warmth, and the overcoats were just too bulky to wear in combat. You need something light and yet with protection against the cold, and with pockets that are reachable when in full gear.

Q: The journal noted the demonstration of a new antitank grenade that the British had developed—the gamman grenade. Do you recall this?

A: I have a vague recollection but remember no details at this time.

Q: I was wondering if it had been used—

A: We (primarily the infantry but in a few cases engineers) did use the bazooka round, which has been developed as an effective antitank weapon.

Q: It had been developed during the course of the war?

A: It had been developed before we went into France. We also, for the only time in my memory, during the Battle of the Bulge prepared defensive antitank and antivehicular obstacles by blowing down trees in the forest and by digging some short stretches of antitank ditch. As defensive measures, so far as I can remember, other than mines, none of these obstacles were ever really tested by the German attacks since we were on the flanks and the major effort or attack was to the south and to the west. After the first few days, we did not come in contact with major first-line German units.

Q: Was that kind of defensive activity something that the troops would have been trained for?

A: Yes, that had been covered in training, although it hadn't been used in quite sometime. Both the junior officers and the noncommissioned officers had been trained and were able to effectively carry out their assignments.

Q: When you went back into Germany, at the beginning of February 1945, do you recall the feeling associated with returning to areas where you'd been before and were now taking over again?

A: As I remember it, there was somewhat of a feeling of discomfort at the fact that we were going back to where we had been before. The feeling was that the Germans had learned well what our disposition was and that we might be somewhat more vulnerable now. On the other hand, plans were being made for an attack to the east, including the crossing of the Roer River. As I indicated previously, this was delayed and made much

more difficult by the flooding caused by the Germans' release of water from upstream dams.

The plan for our Air Force to blow a major dam had been made with the idea that the water would be gone by the time we got ready to make the attack.

Q: What do you think about that decision?

A: I think the decision was fine. The only problem was they weren't able to accomplish it.

Q: So, you think the water would have been gone—

A: Yes. It took ten days to drain. Actually, the Germans in a way helped because, by their releasing the water, we were able to find a means to deal with it. If we had started to cross and then there had been the sudden release of water, there would have been no way to prevent a cutoff of those units that were already across the stream. This way, we waited until the major flood crest had passed. Then we made the crossing in a receding stream and probably achieved tactical surprise because I think we attacked several days earlier than the Germans believed we would under the circumstances.

Q: There was heavy artillery fire?

A: Quite heavy artillery fire, and some heavy casualties. We made extensive reconnaissances throughout the planning time period, including getting people across to the German side. We had a fairly good idea of the location of obstacles, including the width and depth of the two drainage ditches on each side of the river. We were aware of them from intelligence documents. But, by using reconnaissance patrols, we were able to actually find and measure the location for crossing and then develop a means of crossing on prefabricated walkways. These we made in sections and assembled at the sites to allow the foot troops to move across.

We also strung a cable ahead of time between two large trees over the main section of the river. When it came time for the crossing, we were able to use this cable as anchorage for the foot bridge to allow the infantry to cross the main stream. Later, there were fairly heavy casualties at the fixed bridge locations since these were known and the Germans had a chance to register in on them early. These were at breaks in causeways carrying the original roads, and no other places were available that could be used for vehicular crossings. Once bridging started, it was perfectly clear to the Germans where we were working, and we did suffer fairly heavy artillery fire until it could be knocked out by air and by our own artillery.

By the way, I have some very excellent pictures of this Roer River crossing. I actually used this crossing as an example of a tactical river crossing in teaching at the Engineer School back in 1947. Somewhere in the Engineer School is a lesson plan with all of this, including the pictures. I also have copies of the pictures. This action is pretty well documented.

The Rhine Crossing, 1945

Q: Did you have a chance to practice on another river?

A: Not here. We did later on the Rhine River in quite great detail.

Q: What was the reason here?

A: In the first place, there wasn't time. In the second place, there really wasn't any way that we could duplicate a small stream in flood.

Q: In the journal, prior to the crossing, you describe this as the most impossible spot in Germany.

A: Probably an overstatement, but certainly it wasn't an easy one. Fortunately, it was so bad that the Germans didn't expect us there and, except for the artillery fire, the resistance was not great once we got across to the other side. Had they been defending it seriously with troops, it would have been an extremely costly operation for us.

Q: But a necessary part.

A: No, it was a tactical surprise, going where they didn't anticipate it.

Q: And again you had the time.

A: We had known about this, and we had about ten days after we returned from the Battle of the Bulge to finalize our plans. We constantly reconnoitered and kept very close track of the rise and fall of the water so that we were able to predict the water levels, and we had some idea of the current. We made current measurements. During the crossing, we also set up some fairly heavy smoke with smoke generators on the friendly side and smoke shells from 4.2 mortars on the enemy side to block observation of the attack, which was started under cover of darkness.

Q: Were there problems getting the right engineer equipment at this point?

A: I don't remember any major problems. We got some amphibious vehicles for this crossing that we used to put one of the infantry battalions across in an area where we felt we could not put in a foot bridge. We did practice with these. As I remember, they were fairly effective. No equipment shortage per se stands out in my mind as being a limiting factor.

Q: Shortly before this time, around the end of January, the journal referred to the companies in the battalion being reorganized according to the book. The organization had become a "mess"—that is the word that was used—because of new replacements and casualties. What comment would you have on this as far as keeping the organization as it was designed to be? Also, what are your comments about the replacement troops that you were getting in the field; the quality of them and this kind of thing.

A: Again, from the point of view of 35-plus years, nothing now stands out in my mind as being particularly significant or particularly lacking in the quality of the replacements. Having been engaged in fairly heavy combat during the Battle of the Bulge and having been fairly widely dispersed with individual companies working with the infantry regiments, we did need time, not so much to reorganize but to be sure that each unit was filled with replacements; that equipment was replaced—things of this sort. It is vitally important for any organization engaged continually in combat. For instance, we went into Normandy on about the 11th or 12th of June. The first time the battalion was totally out of combat was just prior to the Battle of the Bulge in November 1944—and for only a relatively short time. With the fighting in the Battle of the Bulge there were requirements to replace casualties. As these replacements came along there was a degree of inexperience created simply by the fact that a large number of new people were coming into the units.

We were able to do fairly well in replacing our noncommissioned officers from within the unit by promoting people who had had combat experience. Therefore, experienced NCOs continued to be available. Replacing younger officers was not as easy to do. A fair number of our noncommissioned officers received battlefield promotions as commissioned officers, thereby giving us some experienced people as platoon leaders.

Q: Which was surely an important factor.

A: A unit reflects the quality of the training and the experience of the people, in my opinion, to a higher degree than anything else.

Q: What about black troops?

A: We had none in our unit. That was a period of total segregation. There were none in the division. There were black units from time to time (primarily quartermaster or transportation units) that did support the division, but that was our only contact.

Q: Was your association with the Ninth Army simply because of the area in which you moved?

A: Simply by the realignment of the Army boundaries the north flank of the U.S. forces became the Ninth Army.

Q: Now, for the Rhine crossing, which occurred on 24 March 1945—you did have an opportunity for the advance training and practicing of river crossing?

A: With the Ninth Army directive that we would be pulled out of the line where we were and reassigned to XVI Corps, we did arrange for special training. This was a reflection of my being able as division engineer to work very closely with the division G-3 and the assistant division commander. The units that were to make the assault crossing, together with supporting engineers, went back to the Maas River near Maastricht, Holland. There, for several days, we made practice crossings using assault boats and what we call storm boats with faster and heavier motors. We practiced moving up to and crossing the river on a wide front, which was our plan for later crossing of the Rhine.

Q: Now you related this to your working with the division G-3?

A: I mean, the fact that the line companies worked almost continuously with the individual regiments gave me more time to be not only the battalion commander but the division staff engineer. In a river crossing, the engineer, the engineer plan, and the engineer troops play a very major part. This close relationship with G-3 meant that when the time was available there was no problem in making the arrangements to carry on a practice operation. After all, the Rhine is a major river.

Q: That's the point I wanted to clarify. Do you remember any unique problems associated with crossing the Rhine River?

A: Yes, the first problem was crossing on a fairly wide front in three columns. Also, the river was about 1,500 feet wide and had a fairly fast current. The assault crossing, using power boats, led us to make a very detailed plan.

We were provided heavy engineer support from the corps' engineer units. We planned for the initial waves to go over in storm boats as opposed to assault boats. These were faster and heavier craft propelled by 55 horsepower outboard motors.

I believe we had some 50 of these distributed among the three regiments. We had several problems. One, there was a levee system on that part of the Rhine, which was back from the river a quarter to a half a mile, depending on exact location. Once you crossed that levee, you were in a flood plain, which was open country and subject to visibility from the enemy side.

This led to the decision that the crossing would be at night and would be protected by very heavy artillery fire. It was one of our more detailed planned operations. I remember that over 50 battalions of artillery fired in direct support of the crossing. In order to guide the initial crossing limits, we devised a scheme of setting machine guns on the river bank firing tracers to define the limits of each assault unit sector.

We also used a system of colored lights so that after each boat reached the far shore it could return to its proper area for the next load. Insofar as I know, it's the only time that such a scheme was used. But in those days outboard motors were nowhere near as dependable as they are today.

In order to try to ensure that these motors, which couldn't run for at least two days before their assault use, would start when required, I got from the medical battalion enough chemical heating pads to provide two for each motor. About an hour before time to go, a small amount of water put in the pad initiated the heat source of the pads. By putting the pads on the motor blocks, the blocks were warmed. We did not have a single failure to start at the time we made the initial crossing and didn't lose a single boat in the first wave.

Our major problem on the crossing came considerably later when the support engineer unit, which had done a very good job of ferrying some of the tanks across initially, continued to operate the ferry too long hoping to get one more tank across. The floating bridge was being put in by supporting corps engineer units. Contrary to instructions, the ferry continued to operate. Just about the time the bridge was essentially complete, the motor quit on one of the boats pushing the ferry. The ferry hit the bridge and knocked it out. It took another 12 hours to make repairs and complete the bridge. That was the major adverse event during the crossing. It certainly reinforces the idea that it is very undesirable to operate ferries upstream of a floating bridge. However, the floating bridge was still completed in less than 24 hours after the initial troop crossing.

Q: Even with the accident?

A: Yes. However, it took longer to get the bridge back after the accident than it had taken to put it in. My memory is that it was essentially completed in 8 hours, or a little over, and that it took 12 hours to put it back in after the accident.

Q: And that was just reassembling the same structure?

A: Yes.

Q: How much coordination was there with the other Rhine River crossings at the time?

A: None with the other Rhine River crossings other than the fact that our assault followed very shortly after an airborne assault across the river—by a combined U.S.–British airborne group that was just to the north of us.

Q: So, when you were talking about the three units in column—

A: I was talking about within the 30th Division. We'd passed through another U.S. division that was holding the river bank in three columns; a battalion at the lead of each of these columns. This made the crossing three battalions abreast; regiments in columns of battalions.

Q: At this point, the enemy's obstacles were not terribly formidable, is that not true, once you broke through?

A: Well, the far river bank was fairly heavily defended at the river's edge. Once we broke through the shell and got ourselves established on the other side, then the problem became similar to that with the move across France, of having supplies keep up with the rapidity with which we could move. This was after we got about 15 miles from the river.

Q: Then after this operation your next major point was what?

A: We moved across the north German plain to Brunswick. There we stopped for a while and negotiated with the Germans concerning a possible surrender of the area. They did not surrender in the final analysis; however, actual resistance was minimal.

My next impression concerns the legendary village of Hamlin on the Weser River—the village hall with the stone rat race around it commemorating the emptying of the village by the Pied Piper. Things of that sort stand out, but mostly it was a matter of moving 30 or 40 miles a day, keeping watch for the enemy, outrunning the supplies, and having to be somewhat concerned about protection from the rear—but not a great deal. Hostilities had practically ceased except for a few pockets of short-time resistance.

The only time I had any leave during operations in Europe was shortly after the crossing of the Rhine. I went back to England for three days. When I returned to Muenchen–Gladbach, where my plane landed, my jeep driver was there to meet me. He

had a map showing where the division was supposed to be headed. The two of us drove over a hundred miles across the north German plain. For more than 50 of those miles we never saw an American vehicle or individual, yet so complete was the disorganization of the Germans that we were never in any way challenged. As we went through small towns, we saw white flags waving out of the windows. Our only real scare came when we started up an incline across a major canal. I got a little concerned because I could see no evidence of a bridge structure above the levees. I told the driver to slow down and stop. When he stopped at the top of the levee, there was no bridge. We had been driving pretty fast, since it was beginning to get dusk, and we'd come a long way without any sign of Americans.

We found an alternative way around the destroyed bridge. We picked up the signs that showed where the 30th Division had been, so we knew we were on the right track. Before dark, we ran into the rear elements of American units and knew we were back near the front lines. I thought it was significant that within a week after we crossed the Rhine, two Americans could drive for over 100 miles without any anti-American expression from the German people we saw.

Q: Do you recall the German slaughter of political war prisoners that occurred at Gardlegen on 14 April?

A: I am aware of a report that people were herded into a barn that was then machine-gunned and set afire.

I also remember an occasion when we were moving toward Magdeburg on the Elbe. A small element of the forward section of division headquarters, in trying to gain a little time and catch up with the advance troop elements, decided to take a shortcut. It went through an area the forward elements had bypassed as they turned south. I was the senior officer of the command group. As we started to cut across the triangle, we came into a small village. It was very quiet, and you could feel the tension in the air. We discovered that there were about 100 Allied prisoners of war under control of a relatively few German guards. They were English and Americans, most of whom had been captured in North Africa several years before. With caution and no firing, we released the prisoners. They, of course, were obviously happy to see Americans.

I remember well the filth that they were trying to eat, but yet, in spite of this, how well they had taken care of themselves and the military discipline that existed. The senior Allied officer of the group was a British sergeant major. I admired the spirit, the discipline, and the resolve of those soldiers of both countries.

We observed one man eating the worst gruel I ever saw, and he offered me some. It was almost impossible to look at it, much less eat it. We had with us a few K-rations

and some D-ration chocolate bars that we passed out. We tried not to give them too much for fear it might make them sick. Several walked up and put their hands on my vehicle and said, “Jeep, jeep,” as though it—something they obviously hadn’t seen for several years—reflected, in effect, liberation.

We were able to get some civil affairs people in who got them [released prisoners] housed, fed, and started on the process of return to Allied control. The human interest aspect of the total change in their outlook in a period of just a few minutes was something that I have never forgotten. Their condition was almost hopeless as they were just moved around by their German guards so that the Germans could avoid capture. Then, when we appeared, the guards ran away, and these people suddenly were faced with freedom. It was for them, and also for us, quite an emotional experience.

My most pronounced memory of the rapid movement across the north German plain to the vicinity of Magdeburg was the complete collapse of any organized resistance. Other than in a few pockets where there were German headquarters or other means of organized control, we moved unimpeded during April and early May prior to the surrender.

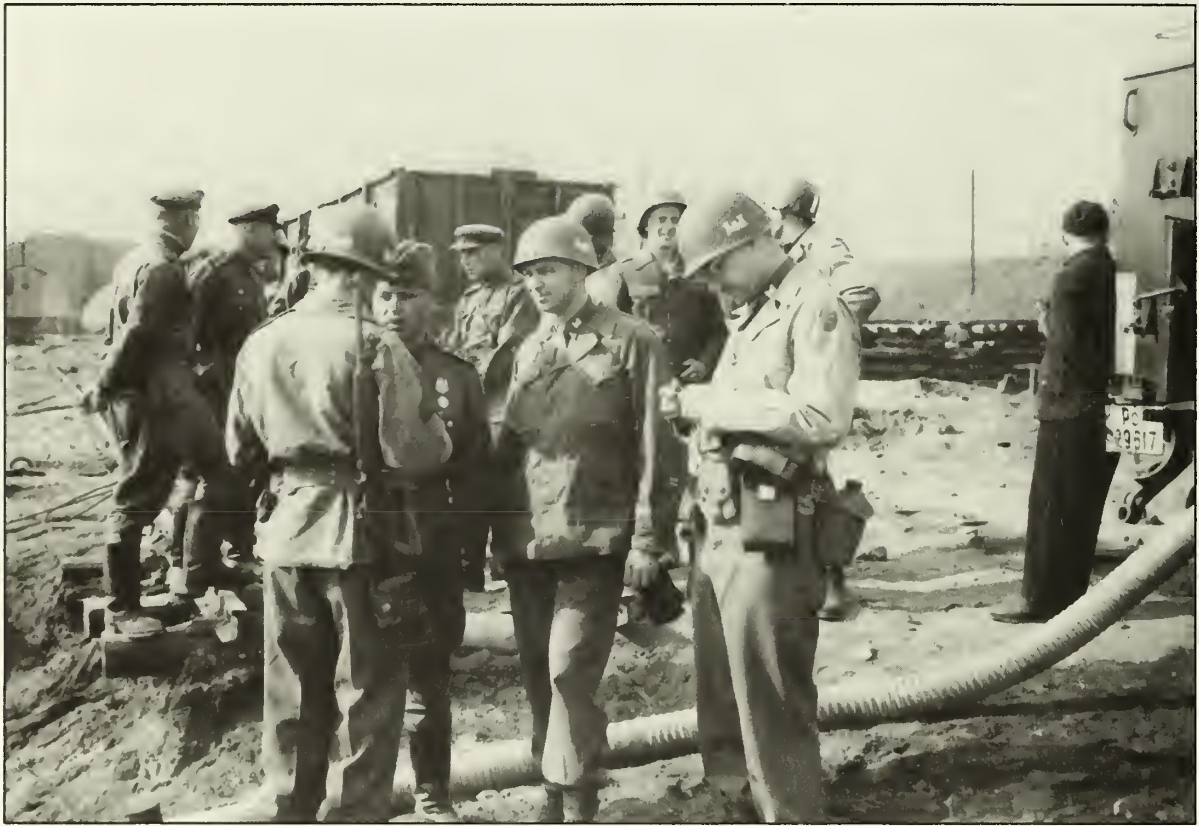
Q: There was another river crossing of the Elbe, wasn’t there?

A: We did not actually cross the Elbe. We stopped at the Elbe and met the Russians at Magdeburg, along the river. I remember the complete destruction of all means of crossing the Elbe, by either air bombardment or by the Germans themselves.

When the Russians did arrive, I participated in negotiations with them to arrange for us to build a bridge across the Elbe to provide our link for the Allied occupation of Berlin. This negotiating was a very interesting experience. It took the better part of a day. We were met at the river and taken to the Russian Army headquarters on the east side of the Elbe. There we had a meal, and we carried on our negotiations through an interpreter. The negotiations were successful; I would rather forget the meal!

We thought we had everything tied down; however, when we sent a survey party across the river to locate the far abutment for the bridge, which was in the vicinity of Magdeburg, the Russians started shooting. This required more talks. The decision was that we would build a fixed bridge near Magdeburg. The Russians would build one where the autobahn crossed the Elbe several miles north of Magdeburg.

I think the Russians considered this location a matter of prestige. The bridge that they built was a very rickety pole structure that would have been hard pressed to carry more than 10 or 15 tons. Nevertheless, they put in the bridge at the highway. Our interest



Meeting with the Russians in Magdeburg, Germany, near the Elbe River, May 1945.

was in getting an adequate bridge. We didn't argue too much about exactly where the location would be. The actual structure was built by Army engineers, and not by our own division engineer unit.

Q: Do you feel you had enough contact with the Russian engineers to make an assessment of them?

A: I had practically none. I'm not even sure that the people we talked to reference the bridges were engineers. The fact is, I suspect that they were not, although one might have been.

Q: What about British engineers?

A: I had a limited amount of contact primarily in England in liaison and at the time of the crossing of the Rhine, since we were next to the British sector. All in all, not a great deal of contact.

Q: What about the Germans? Having marched against them, what would you say about their engineering?

A: I'd say they're quite good. And particularly good at improvising.

Q: At improvising? Could you give me some specifics?

A: Not really; but their ability to make mines, their ability to build obstacles—these certainly were indicative of a fairly well-trained group. I had the impression they could make do with what they had available.

Q: Would you say you learned anything from their approach to things?

A: Well, I think you can learn from any experience. However, I couldn't really point to anything about which I could say, "This I learned."

Q: How often did officials from Washington—from the Chief of Engineers' office—appear in the field? In the journal of the 105th Engineer Combat Battalion, there was a reference to the deputy chief and the commandant of the Engineer School at Fort Belvoir being at the training exercise in March 1945—the river-crossing exercise. Do you recall that and any other instances?

A: I hadn't recalled it until you mentioned it. I do remember, of course, fairly close contact with Corps and Army engineer officials. The historical section of the European theater was very active in trying to be sure that information was recorded. I'm not sure of this, but I believe there was a Colonel [John H.] Carruth who was engaged in assuring that there was some historical record of engineering activities. I'm sorry to say that I can't remember too many cases of people from Washington visiting. Washington was a long way from me in those days.

Commanders

Q: Maybe you'd like to comment on some of the commanders whom you worked with or knew of—their abilities during the war. How about Courtney Hodges?

A: Well, as a commander of an engineer battalion, I had met General Hodges and General [William] Simpson (the commander of the Ninth Army) as well as a number of the corps commanders who participated in planning, particularly such major operations as the Rhine River crossing. As a division staff officer, my relationships were really not so close or intimate that I feel qualified to make any substantive comments.

Q: OK. Would that hold true of people like [Omar] Bradley and Patton and Montgomery?

A: Well, I don't remember ever having met Patton over there. We were never part of Third Army, and he came after we left England. [Dwight] Eisenhower, Bradley, and Montgomery all visited my battalion while we were in England. I was quite impressed with Bradley's apparent knowledge of events important at the battalion level—and of what an engineer battalion was supposed to do.

It happened that he and Eisenhower visited my battalion on two successive days. Having the supreme commander and the Army group commander visit was quite an occasion in any case, so I wasn't really looking at subtle differences between them. Of course, it was very clear that they were operating on somewhat different problems. Bradley's discussion, as he addressed the officers of the division, was obviously aimed at the ground war and what he saw as the coming invasion of Europe. It was clear that Eisenhower was looking at the somewhat larger picture—the political and tri-service aspects of it. My limited association didn't lead me to any feeling other than that they knew what they were doing. My contact with Montgomery gave me, in that one very brief visit, the impression that he was a very aloof and self-centered individual. This was reinforced when we operated briefly under Montgomery in the later stages of the Battle of the Bulge. His headquarters seemed to have a different approach to command compared with others, but again, that's a point of view at a fairly low level.

Q: Would you have specifics on Montgomery?

A: He used a system of personal spies whom he called liaison people. They were deliberately set up to bypass all the intervening chain of command. This hardly seemed to me to be the best way to operate.

Q: And you saw this particularly in the later stages of the Battle of the Bulge?

A: Yes.

Q: You said that Bradley impressed you because he seemed to appreciate the place of the engineers. Was that correct?

A: Yes.

Q: Was this a problem for the other commanders—not appreciating the engineers?

A: I won't say it was a problem. It just happened that during this visit he observed us training. I believe it was mine training. He seemed to not only know what we were doing, but why, and his reaction impressed me.

Q: How about some of the Army engineers like [William]Carter? Did you have much contact with him?

A: I knew Bill Carter quite well. In the early planning I had considerable contact with him, but during the tactical situation my contacts were more with the corps engineers. “Hub” [Hubert] Miller was the corps engineer of the XIX Corps. I remember him quite well. I found him very fine to work with. I would say, of all the corps engineers, we had closer contact with him than with Carter at First Army headquarters. The name of the Ninth Army engineer escapes me right at this minute, but I also had a number of contacts with him [Brigadier General Richard U. Nicholas].

I think there was, in all cases, a desire to push forward engineer support from the rear. Their recognition of the shortage of engineers in the division seemed to go along with my view of what should be done, so I have no adverse comments on the support that we got from the Army and Corps engineer units. I thought it worked very well.

Q: We had an interview with General [Cecil] Moore. Of course, he’s speaking from a slightly different perspective, but he felt in almost all cases—in equipment, supplies, and personnel—the engineers were slighted.

A: He would know better about that than I because the division engineer battalion is a relatively small unit. We did get replacements. That may well mean we got them because we were given priority. I just don’t know. But this does not stand out as having been one of my major problems.

Q: From your perspective?

A: Yes, from my point of view.

Q: What major problems do stand out?

A: There was no time to rest or to complete training. Because of continued activity even during periods of relative quiet, there were always roads to clear, rubble to get rid of, or assistance to give to other units of the division.

Q: You mentioned that your leave, your only leave, was three days.

A: Yes.

Q: Can you think of any further general comments you would like to make or areas that we didn’t cover as far as your World War II experience is concerned—things that you feel are important to mention?

- A: No, except to say that experiences in Korea (in which I was not involved other than at general headquarters in Japan) or in Vietnam (which I viewed from the major headquarters) indicate that you can't win one war and pattern everything you do on it. The situations are different; the aims are different; unit levels are different. So we can't automatically say that what worked in World War II will work the next time, or that something else will be better.

It's a matter of looking at each individual problem and gaining what we can from experience. The experience is to be used for knowing what to look for and how to make judgments. This is much more important than how something was done. I think that sometimes in our schools and training we may lean too heavily on examples, which may tend to become school solutions. These solutions are not always the best choices under a different set of circumstances. I think we need a great deal of caution and knowledge to keep from getting fixed ideas simply because of our past experience.

- Q: Would this be true in terms of thinking about a possible ground war in Europe in the future?

- A: That is hard to answer. I'm talking about any engagement. I really can't think of a ground war in Europe as being anywhere near the same as World War II, even over the same territory. The advent of nuclear weapons and many other new developments preclude this. I can't conceive of a war going on for 11 months, for instance.

One of our big problems was the fact that there was no rotation system. Certainly, I saw it in the engineer battalion, but it was even worse in the infantry units. The million-dollar wound was the thing that kept you in the hospital 60 days or more, and that was the ticket home. Whereas the Air Force had a mission rotation and the Navy also had a rotation system.

There was no rotation system in the ground forces. Consequently, the general feeling was that you were bound to get it if you stayed there long enough. In Vietnam that was taken care of by the one-year rotation policy. While not the best way to fight a war, it provides a very definite improvement in morale.

- Q: Does that trace back to the World War II experience, do you think?

- A: I assume that World War II had a lot to do with it, but I don't know that for a fact.

- Q: What about mobilization?

- A: I wasn't close enough to that to express an opinion.

Q: Mobilization is another major concern now, and the World War II experience is being looked to.

A: I think there are some parallels, but I think we have lots of things now that weren't problems in those days. We had an ability to shift our economy and move. I question whether we have that ability today, or whether we have the means to do it in this open society in which we live. In other words, national action depends on a consensus that what's being done is right. As I've observed Korea and Vietnam, in no case did that national will appear.

Q: But it was true in World War II?

A: It was true in World War II.

1153d Engineer Combat Group, Le Havre, France, 1945

Q: After the surrender in May 1945, your assignment was to the 1153d Engineer Combat Group in Le Havre.

A: This was a group that had supported us on several occasions in operations during the Bulge, and it actually was the major engineer support for the Rhine River crossing. Ninth Army made a decision to change group commanders for what they felt were proper reasons, and on about one hour's notice I was assigned and moved from the division to command the group in Germany. Shortly thereafter, the group headquarters without assigned units moved to Le Havre to serve as the processing headquarters for engineer units being rotated out of the European theater, either to the U.S. or direct to the South Pacific for the assault on Japan.

2d Infantry Division, 1945–1946

I actually stayed with the group less than two months, and then was reassigned to the 2d Infantry Division as it came back through Le Havre on its way to the United States in preparation for going to Japan. This was at the request of the division commander, whom I knew quite well. He had been the assistant division commander of the 30th Infantry Division through most of its operations. He was looking for a G-4 and asked me if I would take on the job.

Q: Who was the commander?

- A: William K. Harrison, Jr. I had no real choice in the first place. In the second place, I knew and admired General Harrison very much, so I assented. After 11 months of combat in the European theater, I got on the boat and came home on verbal orders, a somewhat unique move; but it seemed to work out.

I stayed with the 2d Infantry Division as G-4 through a very trying period, following the Japanese surrender. The division was used as a release unit stationed at Camp Swift, Texas. We were trying to maintain training, yet at the same time we were putting soldiers through by the thousands, simply to process them for discharge. This continued into the spring of 1946, when the division moved to Fort Lewis, Washington.

State University of Iowa, 1946–1947

Shortly after the division's arrival there, I was detached from it and sent to graduate school. This assignment had been deferred six years before when I had orders to go to Cornell for graduate work. Those orders had been canceled with the mobilization of the Army in late 1940. This time I went to the State University of Iowa for a master's degree in civil engineering.

- Q: How did it feel to get back home to the United States after a period of 11 months of combat in Europe?
- A: Well, terrific, really.
- Q: You were married before you went overseas?
- A: Yes, married and had two children. My wife didn't even know I was coming home until I called her in the middle of the night after I got to Camp Kilmer, New Jersey, telling her I was back in the States.
- Q: Where had she been while you were in Europe?
- A: She and the children had been in Illinois at her parents' home. This was from February of 1944 until July of 1945.
- Q: Which is a long time.
- A: Eighteen months or thereabouts. After a short leave, I moved the family to Texas to join the 2d Infantry Division, which had been assigned to Camp Swift.
- Q: You said you were there doing training as well as processing?

A: Our mission was to maintain a trained division as a part of the U.S. forces. At the same time we were receiving men from disbanded units who did not have quite enough points to be released. However, in a few months they would have enough points, and so we were in turmoil trying to train men at the same time we had thousands of people coming through. It became quite a supply problem in terms of keeping track of equipment, uniforms, etcetera.

Then in March of 1946 the unit was reassigned to Fort Lewis, Washington. But we had to stop by San Francisco on the way and parade on Army Day, 6 April 1946. If you try to move a division of 14,000 people by train and put on a parade en route, it raises a few supply problems.

Q: I'll bet.

A: We had a very interesting time.

Q: And then, off to school?

A: Yes, three weeks after I got to Fort Lewis, I was ordered away to school.

Q: OK. And you spent a year there. Did your family go with you to Iowa?

A: Yes.

Q: Is there anything about your graduate school experience that you'd like to mention?

A: Well, there were 15 engineer officers doing graduate work. I was the senior member by both length of service and rank.

Q: Had many of them been with you in the European theater?

A: They were from all over. I had not been closely associated with any of them. It was a good group, and we had a good year—a full 12 months. We started off with a six-week summer schedule, then a four-week session, and the regular session of two semesters to make up the year of graduate work.

Q: Do you recall what your thesis was on?

A: I didn't write a thesis.

Q: You didn't?

A: I wrote a thesis as an undergraduate, but not as a graduate student. Iowa had an alternative system, particularly if you were taking a master's in a subject other than the subject of your bachelor's degree. They did not require a thesis, but they required additional course work. As I remember, I took a total of 40 hours of course credit rather than taking 36 hours and writing a thesis.

Q: And you had your bachelor's in mechanical engineering, and your master's in civil engineering?

A: Right. Apparently, things went well enough during the year at Iowa that in 1958 (11 years after I graduated), the university asked me to retire from the Army and be the Dean of Engineering at the school, which, after some consideration, I decided to decline.

Q: Was that while you were at the Industrial College of the Armed Forces [ICAF]?

A: Just before I went. Actually, they had approached me the year before, and I told them that I couldn't afford to leave the Army short of 20 years' service. When they came back the next year, I had to make a decision before I went to ICAF because attendance there would lock me in for four more years of service.

Q: Was that a hard decision to make?

A: Well, we thought about it seriously enough that my wife and I made a trip out there and investigated it on the site and talked to the people. I wasn't ready to leave the Army, and there were some other factors.

Q: At that point you had about 20 years?

A: I would have had exactly 20 years. But there were other reasons why I thought it was not the right thing to do.

Q: And you had quite a career ahead of you!

A: Of course, I didn't know that then.

Q: No, you didn't.

A: With subsequent events in my opinion, I made the right decision, both from the point of view of the Army and the school.

Q: Were there any other times in your career when you were tempted to retire?

A: Not too long afterwards, when I came back from work on construction of the Ballistic Missile Early Warning System facility at Thule, Greenland, in July of 1960, a senior official of RCA offered me a job as their senior representative for a like facility in Alaska. He was responsible for the radar portion of the Ballistic Missile Early Warning System for the Air Force. That wasn't much of a temptation in view of the fact that I had just spent a year in the Arctic, and I wasn't particularly interested in going back.

Engineer School, Fort Belvoir, Virginia, 1947–1949

Q: I'll bet. Right. From Iowa you went to Fort Belvoir?

A: Fort Belvoir, yes, as an instructor in the Engineer School. They wanted someone who had been an infantry division engineer to take over the combat engineering portion of the course, primarily for the officers advanced course, but also for the basic course.

Q: The combat engineering portion you set up? How did you approach it? I mean, what things did you think were important to include? You mentioned earlier that you used the Roer River crossing.

A: Yes. There were a great many prescribed requirements tied into the curriculum. I used examples from the war but tried to emphasize the training of officers who would be, or could be, division engineers and engineer battalion commanders. We tried to teach the things that they should be concerned about in their responsibilities both as staff officers and as commanders as related to engineers in combat. That was the principal mission. I was not responsible for civil-type engineering. That was a different department of the school.

Q: Was there any feeling about the emerging cold war at this point, in terms of your position?

A: Not really. It was too early. That came later.

Q: Who was the commandant at Fort Belvoir when you were there?

A: General [William M.] Hoge, followed by General [Douglas L.] Weart.

Q: Were these people ones with whom you had much experience?

A: I had not known them prior to this assignment. I had met General Hoge, but I didn't know him.

Q: How about while you were there?

A: Well, I certainly knew them and talked with them on occasion.

Q: Did that begin friendships with, say, Hoge, that lasted?

A: No, not really. We weren't that close.

Q: Do you think, in view of what you said earlier, about your World War II experiences and their applicability, that you had that same point of view in 1947?

A: No. We had all the answers in 1947.

Q: You had all the answers. So really, later experiences gave you the perspective that you expressed earlier in our discussion.

A: Yes. The atomic bomb had been developed, but it was an aerial delivery weapon in those days, so the situation was different. The tendency was to think that the next war was going to be similar, but with the Russians.

Q: Can you mention a few more specific things that you thought were important to stress to the officers at Fort Belvoir who would be infantry division engineers in the future, in view of your relatively recent combat experience?

A: I think I emphasized the requirement for the division engineer to be both a staff officer and a commander—how to do both jobs and their importance. There was a lot of discussion about separating the two jobs, and I felt very strongly that they should not be separated. So I emphasized how I felt both jobs could be done adequately by the same individual, and the advantages of a dual assignment rather than two separate assignments.

Q: Can I ask you for some more specifics on how he would do that?

A: I think I'd have difficulty being very specific at this point in time. Each of the students was required to prepare a kind of a term paper. With my encouragement, one of the officers wrote a paper on that subject, based on a survey questionnaire [completed by] a number of people who had served as division engineers. Not too surprisingly, his [conclusions] came out the same way that I'd been thinking.

Q: Does that survive? That paper?

A: I suspect if you look somewhere in the Engineer Library there might be a copy.

Q: It was a thesis?

A: The title was *The Position of the Division Engineer in the Engineer Combat Battalion*. The author was MacLaughlin Hatch. That would have been in 1948, I think.

Q: And that was on the subject of—

A: The dual role for the division engineer.

Q: Now you said that was your experience in World War II. Was it generally true of others?

A: As far as I know, it was fairly common, although not all of them operated exactly the same. Nothing changed as a result of the questionnaire as far as I was concerned. I must admit, however, I don't remember exactly how the vote came out.

Q: Now we move to Tokyo—or can you think of any more that you want to say about Fort Belvoir?

A: No, I don't think so.

General Headquarters, Far East Command, 1949–1952

Q: In Tokyo, where you spent three years from September 1949 to August 1952 with General Headquarters, Far East Command—this was basically involved with Korea, was it not?

A: Yes, during the later years. But I personally was more involved with Japan and Okinawa than with Korea. When I was assigned to Japan, I was supposed to be the engineer for IX Corps, but somewhere along the way, after I had left the States, my assignment was changed to the Far East Command headquarters. Initially, I was in the supply division of the engineer section. I was not particularly happy since I had been looking forward to being the corps engineer, IX Corps. After a short period there, a new development occurred. A decision was made by the Secretary of the Army that the construction to develop a base on Okinawa would be transferred from the Corps of Engineers, Western Pacific Division, to the Far East Command engineer. The effort basically would be oriented toward using Japan for materials and contractors since Okinawa had been a Japanese colony and possibly would be again.

The U.S. was spending a lot of money in support of the Japanese and the Okinawans, and the theory was that we could combine two requirements. Instead of just giving

money or loans, we could put money into the Japanese economy through construction on Okinawa. Government and Relief in Occupied Areas [GARIOA] was the fund appropriation involved.

Major General James G. Christiansen, the Far East Command engineer, decided to establish a liaison office in Tokyo, in his office, to work with the Okinawa Engineer District. I was selected to be in charge of that liaison office. Having arrived in August, I took on this mission sometime in November. A very detailed study had been made by a group from Washington, headed by Brigadier General George Nold, who, at that time, I believe was the Deputy Chief of Engineers or the chief of military construction. They made a lot of recommendations concerning construction requirements on Okinawa and how it could be supported from Japan. I worked with this group while they were making the study, and then worked out the implementation of the recommendations. I served as the command representative in budget hearings before the Department of the Army, the Budget Bureau, and committees of Congress. As a result, I made six round trips to Washington in one year. At that time it took 40 hours just to cross the Pacific to San Francisco, so I spent a great deal of time traveling. In addition, I made at least one trip a month to Okinawa. For most of two and a half years of my service in Japan, I was totally tied up in working on Okinawa construction activities.

For the last six months, I was in charge of engineering and operations for the entire Far East Command, which then included the Korean War operations as well as other activities. However, my major activity during my three years in Japan really revolved around getting a base built on Okinawa. I think we were fairly successful. Most of the major Japanese contractors you hear of today had been contractors before World War II. After the war they had absolutely nothing. As we started this Okinawa program, they participated and became viable concerns.

Q: That's interesting.

A: It was a unique solution which, as I said, was considered to have been very successful. It was in this assignment that I first knew General [Frederick J.] Clarke. He was then the executive officer of the Okinawa Engineer District, and he and I used to shout at each other over radio telephone between Tokyo and Okinawa about once a day for two years—that is, when the phone was working! That began our very close relationship.

Q: Now would you like to say anything specifically about the Korean War aspect of your assignment?

A: No, because it didn't really affect my own assignment. Actually, I did get set up to go to Korea as the engineer representative in establishing a forward general headquarters

in Korea after the Inchon landing, pending the link-up between Eighth Army and X Corps as it landed at Inchon. However, the link-up took place so fast that no GHQ [general headquarters] element was ever established. As a result, I didn't go to Korea until 1964. Our activity on Okinawa continued during all of the time of the Korean engagement.

Q: Now at this point you had served with the Corps of Engineers for 14 years, and you hadn't had a civil assignment yet?

A: That's right.

Q: What was your feeling about that? Were you getting kind of anxious?

A: Well, I began to wonder because I really had expected such an assignment after graduate work. However, because of the requirement for someone with combat experience in a division engineer battalion at the school, I'd been assigned there. Of course, after Belvoir, I was apparently due for overseas assignment. Then it was time to return to the U.S., and I received orders assigning me to be the executive officer in the Savannah Engineer District. That was on a Friday. When I went to the office the next Monday to pick up my orders and get ready to have my household goods packed, I found that I wasn't going to Savannah. I was being sent to the Waterways Experiment Station at Vicksburg, Mississippi. This was my first hint of any change.

Waterways Experiment Station, Vicksburg, Mississippi, 1952–1955

Q: Do you know what was the cause of the change?

A: No, I really don't. Hydraulics had been one of my specialties at Iowa, and my home had been in Arkansas, very close to the experiment station at Vicksburg. I knew the area. I'd been to the station.

Q: I recall you said that you had been there when you were younger.

A: I don't know what brought it about or whether there was some other factor that I wasn't aware of. But I was delighted.

Q: You were delighted. It was back home.

A: Close to home. I was 100 miles from home and in an area I knew and with a lot of people I knew, including a few who had gone from Arkansas to the station to work.

Q: And it was your first civil assignment?

A: That's right.

Q: There were a lot of changes all at once.

A: And then en route, I was promoted to colonel. In retrospect, this upcoming promotion may well have caused the assignment change.

Q: And when you got to Vicksburg and became the director of the experiment station, what things were going on? I've looked at the statement that you made as part of the first history of the Waterways Experiment Station.

A: There are several passages in the history that probably quote me. One had to do with the Eisenhower-directed reduction in force shortly after I got there. We had to reduce strength by about 25 percent. This was a traumatic experience because there really wasn't any place else for these people to find work. The government was the biggest employer in Vicksburg. It was drastic, but we did all we could to find places for people. We were fairly successful and survived the experience.

Q: During the next several years was there a reversal? In other words, did you build the strength back up?

A: No. Possibly a little bit but not really very much. Their expansion came after I left.

There were a couple of other things of less significance. We built a new headquarters building. This had been planned and started before I arrived. I would have made some changes, but it was too far along in planning to be feasible.

We established a major capability for doing weapons effects tests. The facility on the Big Black River was to do explosive detonation studies in water. This led to a continuation of work by the hydraulics division on weapons effects. They were still actively involved when I was head of DNA [Defense Nuclear Agency] in the early 1970s. This started while I was there, but it had grown out of the nuclear weapons program of the Manhattan District. WES determined the effects of a detonation in water, how it propagates, and so forth.

Q: And that assignment went to the Waterways Experiment Station basically because—

A: They were experienced in hydraulics and model studies.

- Q: I would like to ask you two other questions about the Waterways Experiment Station I'm sure you would anticipate. One is about its transfer in 1949 from the Mississippi River Commission [MRC] to OCE under the Assistant Chief of Civil Works. At the time you were there at the Waterways Experiment Station, there was some pressure to put it back under MRC. And there were two presidents of the commission. Who were they?
- A: Hardin was one. You said you just interviewed John Hardin. He was there most of the time I was there. Peter Feringa was there ahead of Hardin.
- Q: Hardin would have been the major one?
- A: He was for it.
- Q: He was in favor of regaining control. Before getting into some of the reasons given, do you recall the position of the Chief of Engineers' office?
- A: Basically, the Chief of Engineers agreed with having it directly under that office. Their reasoning, I think, was pretty much the same as mine. Only a relatively small percentage of the time—maybe 25 percent, but I'm guessing at this figure—was what we were doing directly related to the Mississippi River Commission. I felt that since we were working not only on civil works activities—including OCE projects but also those of other divisions and districts, as well as on some military work—it was inappropriate to assign the station to a single subordinate element. This was fine when the station was doing only MRC work, but now they had branched out. Other offices for whom we were doing work would feel much freer about dealing with us than they would if they felt [their jobs] were always going to [receive a lower] priority than something that the MRC wanted to do. I still think it's a very valid argument.
- Q: What about Hardin's position, do you recall?
- A: In my conversations with him it was very clear he would like to have seen the experiment station under the division [MRC]. It had been that way during a previous assignment that he had held within the division. He was not adamant on the subject, and never did we have any personal animosity over it. There was just a gentlemen's agreement to disagree. At least, that was my position. It would be interesting if he were asked about this.
- Q: Yes, he should be asked about it. So you would say that even within MRC, there wasn't that strong an effort to—

A: Well, I don't know how strong the effort was. It was very clear that the MRC staff wanted very much to have WES under their control, and my impression was that Hardin inclined toward that view. I suspect that he had some early conversations with [Emerson] Itschner, who was assistant chief for civil works, and was probably told that it wasn't going to happen. As a result, I don't think he ever put himself out on a limb to get it chopped off. There was a lot of discussion and a lot of talk, but I never felt that a change was ever really imminent.

Q: So it's not a case of anything having occurred since 1949 that raised doubts about the wisdom of the original move?

A: I think the feeling was that MRC was the major headquarters in the area and all the Corps activities in Vicksburg ought to be under one command. The one element that wasn't was the experiment station, because the commission office, the division, and the district were all under the commission. From that point of view, it made sense. But from the point of view of work, no, it didn't make any sense at all.

The station was supported by the division in many ways. The Vicksburg District provided real estate support and a number of other services. It was a very close association. But it wasn't necessary for the station to be assigned to the division.

Q: So it's really a question of the prestige of the experiment station and—

A: And its relationship with other customers.

Q: I see that point. And this involved such things as attracting employees or getting the better ones?

A: I think that the real thing was to attract the work that we depended upon; having challenging work was what made it attractive in employing people. Other districts and divisions felt much freer in dealing with us directly than if they were required to go through another office essentially parallel to theirs. There was too much opportunity for them to feel that they were getting second-place treatment. Whereas, if they were dealing with an OCE subordinate office, there was no reason to believe that they would get any less priority than anybody else.

The station's prestige was also a factor. But that, in reality, meant that because people weren't required to bring work to us, we had to convince them that we were the best qualified.

Q: How did you go about doing that?

A: Just by doing a good job.

Q: On the ones that you had?

A: Yes. Being responsive.

Q: Another question I have deals with the decision that was made to complete the Mississippi River Basin model, which was roughly 50 percent complete when you came. Why was there a question about completing it? Was it a budgetary thing?

A: Well, there were three factors. One was budgetary. Second, was a question of whether the model would ever be needed and would supply the data that it was designed to supply. In other words, could the whole system be put together and would it really be useful in flood times? And third, was there any possibility that computers—that were then coming along—might make it obsolete? In effect, that did happen, but it was not a factor at the time. Of course, the model was never completed. More area was added, but it was never really completed.

Q: But at that point, a decision was made.

A: To continue.

Q: There was a flood in 1952 that had some impact on that?

A: Yes, a flood on the Missouri, and the model had been very effective in forecasting gauge heights on the river. This was one of the key elements that really made it logical to continue.

Q: Now you mentioned the computer aspect, but was there a general discussion about the virtues of mechanical models?

A: The virtue was that, once validated, the mechanical model could provide information on any flood. A computer would only work if you could write a mathematical equation to start with. We didn't know enough to write—or felt we didn't know enough to write—the proper equations for various flood plans. Also, the computer capacity that was available then limited the number of variables that you could consider. So the model was really built as a physical integrator instead of an electronic one.

There were two other major activities in that period at WES. One was the silver anniversary of the station. We worked with the city of Vicksburg to take note of the occasion and, I would say, had a very successful celebration. The other event was the

tornado that hit Vicksburg, and the part played by the Corps as a whole—and specifically the station people—in regard to rescue and cleaning up.

Q: Was there a particular reason why the station people were more involved than any other Corps elements?

A: No, not really. We just divided up the town. After the tornado occurred, I went into town immediately and saw the mayor and offered our assistance.

Q: That was in December, wasn't it?

A: Yes. That night or the next morning, General Hardin got a message from the Chief of Engineers instructing him to take charge of the Corps' activities and to assist the city in any way possible. Just as a matter of control, he and I agreed that the station would be responsible for rescue and clean-up at the theater, and the other office would handle other portions of the task. But we weren't the only ones involved. We probably had more of our own people because the district used contractor personnel as I remember. As I said, our principal area of activity was cleaning up the theater. Incidentally, my son and I were at the theater together that afternoon and left about an hour before the tornado occurred.

Q: Were you familiar with the Humphreys and Abbot report on the Mississippi that was published in 1861?

A: I was aware of it. However, I was more particularly familiar with the Jadwin Plan because I had gone through the flood of 1927. I was quite familiar in a general way with the aspects of the Jadwin Plan, which really was the plan for developing of increased protection for the lower Mississippi following the 1927 flood. In fact, while I was still in high school, I had worked on some of the levees in Arkansas and Louisiana under the Vicksburg District.

Q: Do you have any feelings about the virtues of the plan?

A: Well, there were levees, but the plan also included some reservoirs on tributaries to control flow. And the plan included a spillway—at least Bonnet Carré at that time. There were also plans for floodways. One of these was never built because the people in Mississippi, who had a stronger voice in Congress, decided that the way to do this was to flood Arkansas, and the people in Arkansas didn't like it. As a result, the Eudora floodway never came into being, partly because of the objections from the area in which I lived. However, levees on the Mississippi side, under that plan, were higher than the Arkansas levees. With this design, if a break or overtopping occurred, it would occur

on the west side of the river instead of the east. There were lots of hard feelings and arguments on that score.

In the original plan, there was also a fuse-plug floodway at New Madrid, Missouri, which was built.

Q: Did the Waterways Experiment Station get involved in any of the discussions about the Atchafalaya River capturing the Mississippi?

A: Oh, yes. In fact, the model studies for the control structure at Old River were all done at the experiment station.

Q: Was that while you were there?

A: Yes, the start of it. I can't remember exactly when the studies were finished.

Another major project during my tour was the development of Niagara Falls for additional power through a better distribution of the remaining water over the falls. We also did a number of harbor studies on portions of the Chesapeake Bay, the Delaware River, Charleston, and Savannah, among those that I remember.

Q: As far as the Atchafalaya is concerned, you said that there was a model constructed. Do you recall anything specific?

A: The question, of course, was how to operate the control structure to divert the flow of water out of the Mississippi while at various levels. Our soils lab also did some studies of the foundation conditions. But this was primarily a design responsibility of the Mississippi River Commission rather than of the experiment station. The model studies basically related to hydraulic aspects of diversion of flow. Where would the structure be set? How would it be aligned? What size gate openings would be needed to divert a given quantity of water safely under controlled conditions?

Q: Are you aware of the continuing discussion of this issue, and do you have any opinions on it?

A: As I understand it, discussion on the subject does continue. My view is that as long as they can hold the control structure, they will prevent total diversion from happening. I know there are some foundation problems regarding the control structure, and I'm not totally up to date as to exactly what these are. It sits on a very deep silt bed.

Q: So they can prevent the Atchafalaya from capturing the Mississippi?

A: Yes. If they can hold the structure, they can prevent it.

Q: And they should?

A: Well, I think we certainly should try. It would be an economic disaster to southern Louisiana if total diversion ever did occur.

Q: Carroll Le Tellier, who later became a general officer, was one of your assistants?

A: He was there on a special assignment dealing with the measurement of airfield pavements for trafficability. This was a special program for the Air Force. We sent teams to all parts of the world where they had air bases, to measure trafficability and load capacity of airfield pavements.

Q: Is that a typical involvement of the Waterways Experiment Station?

A: WES had an outstanding soils and pavement laboratory. This was a part of the activities in support of military construction at the station. The Corps had a separate laboratory in Cincinnati, Ohio, that was a concrete pavement laboratory. But this was the flexible pavement, or asphalt pavement, laboratory.

Q: How would you comment generally on the civilians whom you had working for you?

A: We had an outstanding group of people.

Q: Did you say you knew a lot of them beforehand?

A: No, not too many of the key people. I knew a few, but not the key people. I think it was an outstanding group of people, who became world renowned.

Q: Do you recall who some of them were?

A: Well, yes. The heads of the three major laboratories. Head of hydraulics was [Eugene] Fortson, and Fred [Frederick R.] Brown, who is now the WES technical director, was one of his immediate subordinates. [Joseph B.] Tiffany was the—I don't remember the title then used—principal civilian during my tour. Willard J. Turnbull would have been the head of the soils group, and he had several people with him: Bill Shockley, I remember. Herbert Cook was head of the concrete laboratory. Really an outstanding group of professional engineers. There's no question about it; they were the experts.

Q: Did you later use some of these people when you were in OCE? I mean bring them into OCE?

A: So far as I know, none of them moved permanently into OCE. Nobody wanted to leave Vicksburg and go to Washington. However, they were certainly available for consultation and were very actively consulted by both the military and civil works people.

Q: The nuclear weapons effects capabilities you mentioned earlier; this was simply to test the effects?

A: As I remember it, it started out as an offshoot of the Bikini atomic tests. The purpose was to see if, through use of models, scale studies of weapons effects could be made based on the information obtained from the Bikini shots. It was a way of using known data to gain additional information.

Q: And that caused a bit of a problem?

A: Well, the explosion tests were being done at the station, and there were many complaints, some from station employees who had houses close by. It looked to me as if the program was likely to expand, so this was the time to do something about putting it on a better footing. We went looking for a better place that was more isolated and came up with what was called the Big Black test site.

Q: What would you rate as the most important function of the Waterways Experiment Station while you were there?

A: I suspect the model studies of various structures being planned, such as dams or other navigation and flood control improvements. Overall, the most money was spent in that area. We were also doing a lot of soils laboratory type work and served as the soils laboratory for the Lower Mississippi Valley Division on more or less a retainer basis. I couldn't name one specific function that was most important.

Q: You worked with the Air Force, too, then, did you not?

A: Primarily in research on military paving.

Q: Would this have been the first time that you were involved with the Air Force?

A: No, the first time I'd been involved with the Air Force was in connection with construction on Okinawa.

Q: Okinawa, yes. But these were all experiences building to your later CEBMCO [Corps of Engineers Ballistic Missile Construction Office] assignment?

A: Yes, I guess so.

Q: Because certainly there you were dealing with the Air Force again.

A: Yes, and my later assignment to Thule, Greenland, was totally on Air Force construction. However, from WES I went to OCE. I had been scheduled to go to the Army War College in 1955. The same day I got notice that I was selected to be a student, I got a call from the OCE personnel officer, General Rodney Smith, who asked me if I'd seen the list of those to go to the War College. I said, "Yes," and he said, "Well, don't get excited. You're not going." When I asked him why not, he said, "You're going to be the executive to the Chief of Engineers."

Executive to the Chief of Engineers, 1955–1958

I can't prove this, but I have very good evidence that this assignment was because General [Samuel] Sturgis, Chief of Engineers, had attended the 25th anniversary of the station. He was impressed enough by what he saw of the organization that he decided when he needed a new exec that I was to be it. I had had no other personal contact with him. All the evidence certainly indicates that it was the impression he gained on that visit that led to my assignment as his exec—it's the only cause and effect that I can put together. I understood that until that time, the exec at OCE had always been selected based on a personal relationship.

I reported in July 1955, and General Sturgis got sick about six months later if I remember correctly. He was away for a number of months during which General [Charles G.] Holle, the senior deputy, was the acting chief. Later, General Itschner became the chief.

Q: September 1956 is when Sturgis unofficially left, but that wouldn't have accounted for the time when Holle was acting.

A: To complete the discussion of the OCE assignment, it was interesting. It was my first experience in getting acquainted with the senior officers of the Corps based on a close association. There were two deputies and the assistant chiefs, who were all brigadier generals. I was a colonel with about 17 year's service when I arrived in OCE. Never having served in Washington before, I found it a real challenge to be the intermediary with the staff and to be responsible for seeing that the chief's instructions were carried out. It also, I'm sure, made me known to many of the senior people in the Corps, and undoubtedly this had some effect on following assignments. That's surmise on my part, but at least it was the means by which I got quite well acquainted with all the senior people in the Corps.

Q: And that included Weary [Walter K.] Wilson, who later became Chief of Engineers?

A: That's right. He was one of the deputies at that time. I had known him before, but we were not as closely associated as during this assignment.

Q: And you would work with him again in CEBMCO?

A: He was the chief when I went to CEBMCO in 1960. Actually, he became chief right after I was assigned to CEBMCO.

Q: What was it like to work with Sturgis? Your relationship with him was fairly short.

A: Very short.

Q: How would you describe him as a man and as a boss and as Chief of Engineers?

A: Well, he was an easy person for whom to work because there was never any question about what he wanted. He was very explicit in his instructions, and it was not hard to determine just what he wanted and what he anticipated. It also was a learning experience, being my first assignment in Washington. He was aware of that and was very supportive and helpful.

It was kind of an anomaly to have a colonel in that position; however, I got along very well with the senior people. For one thing, I made sure that I never issued any instructions. I had no problem saying that General Sturgis would like to have you do so-and-so, and that was accepted. They had come to know that I wouldn't say it unless it came from him, and there was never any question but that I was simply carrying out his instructions.

The other part of my job was to coordinate and be sure that papers that went to him were complete and that whoever should have had an input wasn't bypassed.

Another major activity was to correlate and establish a basis for updating what was then called "Engineer Orders and Regulations." We needed a more logical format than the bound book used up to that time with no provision for any changes or additions.

Q: How was your working relationship with General Itschner?

A: Itschner was much harder to work for because he had a hard time delegating. He was a very intelligent individual who had a tremendous capacity and was inclined to get involved in many, many details. Therefore, it was much more difficult to be sure just what it was that he expected and wanted.

I can remember that it was six months after I started working for him before I heard one word as to whether I was or wasn't doing what he wanted. I assumed I was, lacking any instructions to the contrary. But really, it was about six months before he said this is what he wanted me to do. He operated differently because of his inclination to get himself involved in tremendous detail. I emphasize that he had a tremendous capacity. I don't mean to imply that he let other things go. While Sturgis was content to look at the broad picture and say let's do this, Itschner was much more involved in the preliminary details as well as the final decision.

Q: And he took home tremendous amounts of work, according to General Wilson.

A: Yes. I think you'll also find Wilson felt that Itschner was very hard to work for.

Q: One thing that General Wilson said about that period when he was in military construction—1956 to 1960, while General Itschner was chief—was that he felt that General Itschner favored the civil side of the Corps over the military side. General Wilson saw himself as trying to protect “the military side” from this partiality that General Itschner had as chief. Maybe you would have a comment on this, too, both because you were the exec at this time and because later you were in charge of military construction.

A: I don't think there's any doubt but what Itschner, having moved from head of civil works to be chief—although there was a short period when he was deputy—definitely was much more at ease with and had a much closer relationship with the civil side. It would be hard for me to say that he ignored the military side. On the other hand, I don't have any problem at all seeing what General Wilson was talking about. It was also true that the military side always had somebody else looking at it in the Pentagon. On the civil works side, whatever went out of the chief's office was the final answer. This was true at that time, but is not any longer. I think both his background and his final authority for civil works led him to give a lot more of his time to the civil side than to the military.

Q: Do you recall Joe Tofani?

A: Yes.

Q: We've been interviewing him about his career. How closely did you work with him?

A: He was in civil works as chief of planning. I knew Joe Tofani well. I had more contact with him after I left OCE than while there. He was in the same job while I was the division engineer of the Southwestern Division, and I would come back to give testimony for annual budget hearings. I also knew him through my service on the Board

of Engineers for Rivers and Harbors. My association was not direct. He never worked for me nor I for him.

Q: I don't think we talked about any specific projects that were important Corps of Engineers projects when you were there in 1955 to 1958 as executive to the chief. What was your involvement in construction in Morocco and Korea and with some of the major civil works projects?

A: In terms of policy, I was not deeply involved. But, of course, I was aware of the projects. Responsibilities were pretty clearly defined for the appropriate assistant chief of military construction or civil works. Other than being aware of the projects, possibly passing information to the chief or indicating his desires to the appropriate people, I was not directly involved. This was more of an administrative job and that of coordinator rather than policy maker. There were a number of key events at that time, such as the hurricane in the Northeast and the resulting Project Noah that involved OCE quite materially.

Q: That was soon after you got there, wasn't it?

A: Yes. But again, that position was more one of being responsible for things being coordinated and keeping the chief informed rather than making policy. Such things as arranging for the division engineer conferences were a part of the administrative responsibilities; also, a general supervision of the administrative support for the chief's office. I provided some coordination with the remainder and other elements of the Army staff—I could not cite a major scientific event for which I could say I personally had major responsibility. There were others more directly responsible.

Q: Did you find the structure conducive to getting the job done?

A: I think it worked fairly well. There seemed to be fairly well-defined responsibilities. There were some questions about the two-deputy system in relation to the responsibilities of the chief and the chief's office at that time. My analysis was that the structure worked relatively well. When the supply mission was removed from the chief's office and some other activities were no longer there, then I think the decision to move to a single deputy was a move in the right direction.

Q: And you later were deputy chief.

A: Yes.

Q: We talked yesterday about the differences between working for General Sturgis and for General Itschner. Did you have any problems with them, or did you find yourself being a spokesman for them to other people within OCE or the districts and divisions?

A: Not so far as I remember. As I think I indicated yesterday, I had no particular difficulties expressing to others in the chief's office the chief's desires or interpreting those desires when asked. And so far as I know, in presenting the positions of others to him, things seemed to work out fairly well. If there were problems, they were not sufficiently severe for either the chief or one of the senior people in the office to make an issue of them.

It was a relatively quiet time. I received major benefits from it being my first assignment to Washington and also my first assignment to OCE. It provided the opportunity, first, to get well acquainted with the senior people in the Corps and, second, it gave me an overview of just how the Corps of Engineers operated in both Washington and at field levels. It was a good training assignment for later activities. I got to see the worldwide responsibilities of the Corps.

Q: How about relations with the Air Force in that period? Later on, you'll have a great deal more contact when you're in Southwestern Division, with CEBMCO, and then back in OCE again.

A: There were no particular problem areas with the Air Force that I remember. A little later, questions were raised as to responsibilities and just what the Air Force would do on their own and what the Corps would do for them. It so happened that my next assignment, after OCE and a year at the Industrial College, was to East Ocean District as area engineer, Greenland. This was basically supervising construction for the Air Force on the Ballistic Missile Early Warning System and its support in Greenland. There were a few questions raised in regard to coordination with the Air Force but nothing of significance.

I think most of the strong discussions came up later and had to do with the ballistic missile work, which was after Greenland. I do recall that General Sturgis arranged with the chief of yards and docks of the Navy to establish liaison, which had not been done heretofore. I served as his representative to the Navy concerning mutual problems.

Q: Do you know the motivation for this?

A: I don't think there was anything major that caused this—just the idea of having a point of contact for things that might be of mutual interest. This was not a major activity, but it established a system by which the two offices could keep in touch.

Q: You spent an interim year at the Industrial College of the Armed Forces, so you stayed in Washington. What kind of experience was that in terms of preparing you for later assignments? Was this a common assignment?

A: Well, as I indicated before, in 1955 I was slated to go to the Army War College, which might be considered a more usual assignment. That was deferred by my assignment to OCE as exec. My assignment to the Industrial College, in effect, was an alternative to going to the War College. Generally speaking, in theory at least, the National War College, the Industrial College, and the Army War College were considered to be basically on about the same level and were designed for about the same time in service. Considering the fact that I was in Washington, and therefore didn't have to move to go to school, there was an advantage in going to school in the Washington area. If I had been completely free to choose, I might have chosen the National War College as an alternative to the Industrial College.

Q: Was there any particular reason why?

A: My interests had been more in operations than in logistics.

Industrial College of the Armed Forces (ICAF), 1958–1959

Q: Was there a reason why you were chosen for ICAF?

A: As far as I know, the selections were by a board, and they had their own reasons. I was not particularly unhappy about it, and I think it was a useful year. One of the things I remember is that it was the first time in years that I was responsible only for myself. From that standpoint it was a refreshing interlude that gave me time to think and consider things other than organizational and administrative responsibilities, which had been fairly constant over a long period, certainly including World War II.

Q: And that's an important part of an officer's development?

A: I think it is important to be able to get away and stand back and look. So, all in all, I was very pleased with the assignment and the opportunity to get to know a number of officers not only within the Army but from other services as well.

Q: Did you go to the Command and General Staff College?

A: I had not gone to a regular course at Command and General Staff College. In February 1942 I went to a short course there called the Seventh General Staff Class. After the war, that course and my wartime staff experience were considered to be equivalent to

the Command General Staff College course, so I was given credit without ever attending.

Q: I think in our interview in April I asked you if you encountered any problems not being a West Point graduate. Your assessment, I believe, was that you had expected that as a possibility but you had not found it so. Did this continue to hold true?

A: I think I said then—I'll say now, anyway—as far as I'm concerned it didn't make any difference. I never ran into any problem.

Thule, Greenland, 1959–1960

Q: What was behind your assignment to Thule, Greenland? Why were you selected, and how did you feel about this assignment?

A: I don't know what was behind it other than the fact that there was a job to do there. It was a key job for the Air Force and one that the chief and General Wilson, who was the deputy at the time, felt very strongly needed to be done. I was apparently a candidate for overseas assignment at about that time. Why I, specifically, was chosen, I don't know. I do know that I complained a little bit about it. Having had the experience of 21 years of service, I thought I was a little bit senior to be taking an assignment as an area engineer.

However, other than my experience at the Waterways Experiment Station, I had not been directly involved in construction, either military or civil. I assume that had something to do with the decision. In retrospect, I still feel that I was a little senior for the assignment, but it was a good experience. I think we were quite successful in executing the program under some tremendous environmental handicaps. The combination of the darkness and cold and long supply line made it an extremely difficult operation.

Q: About how many people did you have working for you?

A: The contractor was a partnership with Peter Kewit as the principal. The architect-engineer was Metcalf and Eddy, who did some on-site inspection working for the area engineer's office, which had about ten people. It was a very cooperative group that worked very well. As far as numbers of people, my memory is that the contractor employed about 2,000 craftsmen at peak strength.

As I have said in the past, on the 2d of January 1960, we were very actively engaged at the peak of activity. It was minus 40 degrees, dark 24 hours a day, and we still had

2,000 construction workers on the site. This is a fairly remarkable achievement, I think, in terms of productive work. We were able to overcome most of the environmental difficulties and do a reasonably satisfactory job.

The job actually resulted in a decrease in original contract cost after it was completed. It was an incentive-type contract and was completed not only within budget but at a reduced cost, for which I give the contractor a very large amount of the credit. He had it well organized and had some good people on the job.

Q: At what stage was that program when you went there? Was it at the very beginning?

A: The construction had started with some foundations in, but the major work of erecting the buildings and their interiors, setting equipment in place for the Air Force contractors (RCA and GE for the radar equipment), and erecting the radar towers all took place during that year.

Corps of Engineers Ballistic Missile Construction Office, 1960–1962

Q: And from there you went to an assignment with the Ballistic Missile Construction Office, which would be at that point in Los Angeles District?

A: I returned from Greenland in July 1960 assigned to command an engineer group at Fort Belvoir. This was in line with normal career patterns since I had not had troop command since World War II. About the time that I returned—I'd been back about 10 days and was on leave—a decision was made by the Secretary of Defense, over the Air Force's objection, that the Corps would be responsible for the construction contracts for the ballistic missile program. We had had a small liaison office working with the Air Force in the Los Angeles area up to that time, and a decision was made to enlarge that office. The new office was to have the direct responsibility for construction rather than having the construction responsibilities spread over existing districts. This had been the case in the Atlas F program, which was the only one under way at the time. That decision required assigning several officers as program directors for the various missile programs, and I was one of the four selected and was assigned to the Titan II program. Actually, I knew nothing about this as it was developing.

Having returned from Greenland, I'd done some work around the house, and we were getting ready to go on a vacation when I got a call Saturday morning that the chief wanted to see me. I happened to be in the barber shop at the time. But my wife got in touch with me, and I went by the office late Saturday morning. I was told what was happening, and on Monday I was in Los Angeles. I did not get to complete my leave

nor make any provision for moving my family. That indicates the speed with which the organization was established and began to operate.

Q: What was the reaction to this new assignment? Was it welcomed?

A: Well, I'm sure that there were people who felt that no special organization should be established for this program. However, it was a very large program and required working very closely with the Air Force, which was responsible for supervising the design as well as the follow-on weapons placement. This necessary close contact with the Air Force, in my mind, made it an appropriate decision.

Certainly, if there was unhappiness, it didn't really show. The organization for CEBMCO was essentially staffed with people from the Corps as a whole; I don't know of any other organization or any other means by which such a quick response could have taken place. As I remember the figures, there were 50 or 60 people in the liaison office when it became an operating element under Al Welling. Tom Hayes was his deputy; Hayes having been the head of the liaison office. Colonel [Carlin H.] Whitesell was to be the Titan I director, I had the responsibility for Titan II, [Charles C.] Noble had the Minuteman assignment, and "Woody" Wilson was in charge of completion of the Atlas F program. We established the office and within 30 days we were actually in operation. Within six months, I guess there were a total 1,500 Corps people spread out across the country at the various missile sites, with work actually under way. I think it was a tremendous accomplishment. One of the things that made it possible was the fact that we had Corpswide standard contract procedures and methods of operation so that we could gather people together from a large number of Corps offices and they could "hit the ground running." We didn't have to establish a lot of new procedures in order to "go."

The Titan I and the Atlas F projects were both under way, and they were taken over as they were proceeding. Titan II had not started, and Minuteman was a little bit further behind. For the Titan II program, we established the office early in August and let the first contracts for field work in early October. We continued to build the program very rapidly and established field offices in Little Rock, Arkansas; Wichita, Kansas; and Tucson, Arizona; appropriately manned with both military and civilian personnel as required. My view is that the responsiveness of the Corps and the availability of uniform procedures for operating, including contract administration and construction supervision, were outstanding assets in making a successful program possible.

Q: Is that why the Secretary of Defense made this decision? Do you have any insight into that decision?

A: I wouldn't comment. I was not a part of it. I think people like General Wilson and General Itschner are better able to give details than I am since they were actively involved.

Q: What was particularly distinctive about the Titan II part of the project as opposed to the other systems?

A: The Titan II was the first of the ballistic missiles that was to actually fire from the silo. The Atlas and the Titan I, which were both large, long-range missiles, were built with the idea of being raised to the surface on an elevator system before they were fired.

The Titan II was a missile fired from its storage location, and the silo became a gun barrel. There were major problems in terms of structural capability to withstand the firing forces, as well as differences in the fuel system.

It was the first of the missiles to use fuels that were not cryogenic—in other words, not super-cooled. Therefore, it was a different system. The main difference was the close integration of the silo as a firing tube, which added to the problems of close tolerances during construction of the silo.

Q: Did you have to do a lot of self-education on the system and how it worked?

A: Yes, though, as I say, the Air Force through its parallel office was responsible for the supervising of design. The biggest problem was close coordination with the corresponding project officer in the Air Force who had responsibility for design. We were co-located, and we worked together very closely.

One of the most significant aspects, I think, was the decision to do the construction in phases. This later became known as “fast track.” We did separate the contracts so that the first major contract was for the excavation and structural concrete. The planned interface for later work was the interior of the main silo concrete. The internals, including mechanical and electric work, would be added by second and third contracts since design was not complete at that time. While there were numerous changes involved, this contract separation, in general, worked well and probably saved 6 to 12 months in completing the construction of the system.

Q: What was the origin of this idea?

A: It basically was worked out jointly by the Air Force and the Corps. Of course, the key to it was having the designer, which happened to be the Parsons Company, design an interface with flexibility in the final work, which allowed the contracts to be separated.

The follow-on contracts were largely electrical and mechanical, with the initial contract largely for civil and structural work.

Q: How easy were the Air Force representatives to work with?

A: Well, they varied, but basically, while we didn't always agree on everything, I would say the coordination and cooperation were excellent. The fact is, I still have close friends among the Air Force people whom I met at that time. Any animosity caused by the secretary's decision for the Corps to supervise construction certainly didn't interfere with getting the work done. Both at the headquarters and in the field there was a great deal of very close cooperation required and given.

Q: What about the liquidated damages provisions?

A: I'm sure there were some liquidated damages. The fact is the contracts were very closely drawn, with milestone dates and other requirements. But without reviewing the contracts I couldn't specifically comment. In my opinion, on Air Force insistence, we put some unreasonable dates in the contracts. They felt these would be an added incentive to the contractor to meet his schedule. I'm convinced that in some cases these deadlines were counterproductive, but this was one of the areas in which there was a good deal of disagreement. These were attempts to put into the contracts very critical and short dates through a series of milestones as measures of contractual performance. While I remember that dates were not easy to meet, I don't remember major difficulties in terms of liquidated damages.

Q: I found in our office records a transcript of an interview. I'm not sure whether it actually was an interview. I think it was more in the form of comments that you made about CEBMCO after you'd gotten to Dallas. You said that one of the biggest sources of difficulty at CEBMCO was the fact that the Air Force was over committed so that fund availability was a constant concern. Would you like to comment on that?

A: Well, I don't think I have anything to add to that. They were trying to run a tremendous program with four major systems at the same time. Certainly, funding to meet a rigid schedule was a problem, also their feeling that they wanted to be certain that we didn't pay more than necessary and that we got strong competition for the contracts. There is nothing wrong with that, but some of the deadlines they insisted on mitigated against the best actual bids. There was always a question of judgment as to how and when to structure the bids. Certainly, the more restraints and milestones and other requirements put in, the more contractors would be inclined to add contingencies.

So things, as I say, did not always work together, but again, these were problems of the moment. I think one of the most significant decisions we made—and this was made by

CEBMCO as a whole, not directly by me, although I was a part of it—was to go into a system of prequalified contractors, which had never been done in government contracting.

With the help of the chief's office and particularly the legal people there, a procedure was developed to prequalify contractors so that we knew that those who were invited to bid on each contract had the capability to do the work required. This included considering type of work, size of contract, and both the financial and management capability. In my judgment this, as much as any other one thing, was responsible for the success of the program. When I went to Dallas and had the responsibility of building the Manned Spacecraft Center at Houston, under the supervision of the Fort Worth District, I instituted the same system of prequalified contractors for that program. Again, I think, with very good results.

Q: This "fast-track" system that you mentioned, is that at all related to the critical path method?

A: Critical path is not a method. Critical path is really a planning schedule means by which you break a project down into a large number of individual action items. As a result, you can follow the project very closely in terms of where you stand at any given time.

Q: It's a monitoring device?

A: It's more a planning and monitoring device.

Q: Using a computer?

A: If available, you can use a computer. Originally, it was done by hand. It still can be done that way.

Q: Was that instituted while you were at CEBMCO?

A: We used it on some of our contracts, and the Air Force had an overall project system using essentially critical path schedules. This basically had come out of the Polaris program of the Navy, as I remember.

Q: Did you carry that with you to Dallas?

A: Partially, I did. I set up a major study of the Arkansas River program that was essentially based on critical path scheduling.

Q: What would you say about the experience—you used a number of junior officers, of course, at the resident area offices. What do you think about the experience that they gained there? Was that a critical factor for them in later assignments? Did you see individuals who had had those positions being used later on when you were in Dallas and OCE?

A: I think that the use of junior officers in this job served several purposes. One: for the most part these officers were graduate engineers who had technical expertise available on the site. They had had some experience in management and, when backed up with qualified inspectors from Corps districts, made a good on-site supervisory organization. Again, the combination of military and civilian employees, as has been routine throughout the Corps, worked very well.

I would say that those individual officers got tremendous experience out of this assignment. Many of them went on to be district engineers and to other assignments where this early experience in the field, I'm sure, was extremely useful to them. But initially this was probably a secondary consideration; the idea was to get qualified people quickly, and we used both civilian and military assets to set up these offices.

Q: You said that under these circumstances, this separate operating organization was preferable to the standard district and division organization. In what other cases do you think such an organization is merited? What is it about a particular program that warrants a separate organization?

A: In the first place, I wouldn't say that this is always the right answer. I simply said that in my opinion, this case represented a peculiar combination of the Air Force requirements—it was already well under way in design, a very large program, and widely distributed—and it justified setting up a special office to do the construction.

This was done again at the time of the establishment of the antiballistic missile system, which, though it started as a fairly broad operation, never exceeded two sites being worked at any one time. The NASA program, which was fairly widely dispersed, was established with a coordinating office in the chief's office with the work accomplished by the individual districts and divisions. The NASA program was not under the same pressure gradient, did not use the same design for multiple locations, and was not such that it needed to have a superimposed special organization.

I think that each case is usually different. The main thing to consider is the flexibility and the availability of the Corps to operate, either through the existing organization or by making changes as necessary in that organization, and to meet a specific requirement and mission. The strength lies in the qualifications of the people who are available regardless of the management chain through which they operate.

Q: When you encountered the problems that you did encounter working with a separate organization that was, like the Air Force, so involved in design—and I mean problems basically of funding and contractual arrangements—did the Corps try to influence a change through the Department of Defense? Did they think that certain methods and procedures were better than others?

A: We were required to follow procurement regulations. I would say that where I, as the director of the Titan II program, felt strongly that a particular type of contracting wasn't the desired method, I got support both through CEBMCO and the chief's office for my position. I don't remember any major disagreements. I felt I was supported all the way through on those things which I wanted to establish.

For instance, I set up procedures for government procurement for about 30 major equipment systems. This procedure was to insure uniformity with each missile silo complex for all major equipment as well as to control delivery of these items. They were bought under materials supply contracts I negotiated rather than having contractors supply materials. These included things like the standby power system, the mechanism for door operations, other pieces of equipment such as pumps, and other items that we wanted to standardize for all of the 50-odd silos. I didn't have any difficulty in setting it up. Actually, I used different Corps offices as procurement offices. For instance, I remember the Kansas City District did a lot of this procurement.

Q: Was that an arrangement for having the office nearest the successful bidder as the procurer?

A: No, we selected the office based on where we thought bidders were likely to be. They were used to handle supply contracts. While we had people in CEBMCO who were qualified in construction contracts, we weren't as used to handling supply contracts. We also used the existing Corps system for in-factory inspection and expediting.

There was another thing that I did that I think was very useful. I made it a point to visit the manufacturer of each critical item or piece of equipment sometime within the first few months after the contract was signed. The purpose was to personally impress on the manufacturer's key people the importance of what they were doing for the overall project.

This also gave me a personal contact at each of these plants so that later, if there were any difficulties in deliveries, I could take direct action. I'm firmly convinced this was well worth the effort to see for myself and to be seen and be able to talk to the people and impress on them the necessity for meeting their commitments for delivery of these critical items.

Q: Did you have to go to the area offices under your program frequently?

A: I made it a point to visit each area office at least once a month.

Q: Where were they located?

A: Tucson, Little Rock, and Wichita, and, indirectly, Vandenberg Air Force Base, where three silos were being built by the Los Angeles District under its responsibility for all work at Vandenberg. Over the period from August 1960 until I left the program in February 1962, almost without exception, I visited every area office at least once a month and saw most of the individual work sites on each of those visits.

Q: Your deputy was Robert McKenzie?

A: Yes.

Q: And he was a civilian?

A: He was a civilian employee who came from the Los Angeles District with considerable experience in both military and civil construction. He was an old-timer, well qualified, and a tremendous help in overseeing the day-to-day operations of the project office during my extended travel. He was the anchor, the fellow who stayed most of the time at the office to keep things running on a day-to-day basis. He did an outstanding job.

Q: I wonder if you would comment on some of the other individuals involved, such as the other project directors—Noble and Whitesell as well as Hayes and Welling—their suitability to these assignments and experiences that you had with them.

A: Basically, while I won't comment much on individuals, as I have said, I think the organizational idea was a good one. I think, too, that a good job was done in selecting people to hold the key offices. With the decision to place a general officer as the head of CEBMCO, Welling, who'd had considerable experience and who knew the Corps well, was a good choice. He had served, among other jobs, as exec to the chief. His background in dealing with the Corps and his experience in dealing with the Air Force shortly after World War II helped. I think he was an excellent choice to hold his own in a very strong Air Force environment. As a manager, he had his idiosyncrasies, and these made him not always an easy person to work for or deal with. But, under the circumstances, he was a good choice for the job.

Tom Hayes was a very practical, technically well-qualified individual. And I suspect, though we have never talked about it, that his experiences as deputy to Welling may

have left scars. Nevertheless, I think he did a very fine job of being the alter ego in the headquarters.

As to the individual directors for various systems (there was a change in one after the initial selection), I believe that events proved that the selections were wise of the four who have been named—Whitesell, Noble, Wilson, and I. I personally had known all of the officers involved, some a little better than others. I'd actually worked for Whitesell during my service in Greenland since he was the district engineer, East Ocean District. Noble and I had served together as lieutenants on the Mexican border.

Q: That goes back a ways.

A: Back to about 1940. Wilson I had not known as well, but I knew of him. So I feel the combination of both people and organization was a good one, as the results proved.

Q: Do you have any other comments you'd like to make about that experience before we talk about the Southwestern Division?

A: I don't think so.

Southwestern Division, Dallas, Texas, 1962–1964

Q: When you got the assignment to Southwestern Division (at that point, too, you would become brigadier general), you had not had a district assignment as such. Was this unusual? Of course, you did have your Waterways Experiment Station experience, and, as you mentioned earlier, while this wasn't really a construction job, it was a civil job and you had OCE experience. How did you feel about getting this assignment?

A: Well, obviously I was glad to have it. Basically, my assignment from CEBMCO ended a little earlier than it normally would. In other words, I was promoted out of the job. We were well along in the Titan II program but it had another year or so before completion; however, it was well on track with an existing organization moving ahead. So, with my selection for promotion, a reassignment became necessary.

I was told of this by the chief, General Wilson, and I was delighted at the idea of going to Dallas. Since Arkansas was my home and one of the districts was the Little Rock District, I had some knowledge of the division's activities.

As far as preparation for the job, I think the combination of experience as director of the Waterways Experiment Station, exec in OCE, and actual field experience in Greenland along with being the director of the Titan II program probably gave me as

much or more experience in actual construction and its supervision as anyone who might have gone into the position. From that point of view, there was no particular worry; I felt I had the background to do the job.

I think the experience at the experiment station in managing what was essentially a civilian organization, as the experiment station was at that time, gave me the opportunity to be well acquainted with the Corps' method of operation. From my experience in OCE, I was also familiar with both the military and civilian side of the Corps and the system of planning civil works projects.

Certainly, I'd had good experience in dealing with the Air Force, and we would be responsible for its construction in that area. My feeling was that it was not a particularly traumatic new experience but simply a move into a broader level of responsibility for which the assignments of the last few years had pretty well prepared me.

Q: One of your major projects there was to provide NASA support and to help direct the Johnson Space Center construction at Houston. Did the Corps get these projects because of its experience? Of course, it already had some NASA work under way at that point.

A: Again, I think General Wilson is probably the best qualified to answer this question in detail. My understanding is that with the formation of NASA as a new organization, Mr. Webb, who had been head of OMB [Office of Management and Budget], was designated as the administrator.

He, realizing the task of beginning a space program while trying to put together the facilities needed to support it, looked around to see whom he could call on to assist him. From his experience in OMB, he was aware of the Corps' countrywide operation. My understanding is that he entered into an agreement with General Wilson for the Corps to be the construction agent for NASA with assignment to the appropriate division of the facilities that were in that division's area—South Atlantic for Cape Canaveral and Huntsville, Southwestern for the Houston center, and South Pacific for activities on the West Coast.

A coordinating office was established in OCE with General Hayes designated to be in charge and to work with NASA headquarters. While it was a unique system, what we built at Houston was, in effect, a technical college campus on what had been a cattle ranch. When I arrived in Dallas and made my first visit to Houston, they had just started digging a few trenches to put in utilities in an open field. This then became the Manned Spacecraft Center for coordination, control, and training of the astronauts for the manned space program.

The Fort Worth District, at that time under Colonel Frank Koisch, was assigned the responsibility for supervising design and construction. The district carried out the mission well. I gave it a considerable amount of personal attention, visiting the site at least once a month or every six weeks and maintaining close coordination with the NASA people in Houston.

Q: Do you recall major difficulties at that time?

A: I would say the major difficulty was in getting decisions from the NASA people. As a new organization, they had no established procedures. Each element of the organization would put in its ideas of what it wanted, and it was our job to come up with a complete design to carry the construction forward. Lacking any criteria, there was a wide variance in what various people desired.

So, one of our biggest problems was coordinating the desires with reality and establishing for the various facilities some general criteria that we felt were not totally foreign to other government activities. We, in effect, developed space and other criteria based on the experience of the Corps, GSA, and other agencies. We “sold” these to NASA to provide appropriate controls so that facilities wouldn’t be “gold-plated,” as they might otherwise have been if left to the individual desires of the people involved.

One of the real significant factors was that this work was going on while the NASA people were operating an ongoing program and starting the Mercury and Gemini programs. We had to catch them when they were not otherwise engaged. I would say getting a firm handle on the requirements and the criteria to meet those requirements was the biggest single problem, and then, as always, the funding availability was a matter of concern.

Q: I think one of the issues there was cost estimates at the outset of construction. I believe you indicated you thought this was the best approach but it was not part of NASA’s approach.

A: Again, I think this goes back to the criteria. You can’t make a good estimate if you don’t know what you’re going to build or to what standard. We had a constant battle getting firm decisions on which we could make good estimates. Until we finally reached a good understanding of what those criteria would be, it was always a problem trying to forecast the cost.

One major item of discussion that reached high political circles was the exterior finish of the buildings at the space center. We had decided that it would be precast exposed aggregate panels. There was a great deal of political pressure from the masonry industry and brick layers’ union to convert to brick masonry construction. We had to

make several studies to convince the people in Washington that we weren't adding to the cost by our decision.

In this case, brick construction, we found, would be more expensive and take longer. One of the reasons why I very strongly favored the tilt-up type, precast panels, was the ease with which we could enclose a building once we put up the steel framework. In the Houston area, which had a considerable amount of rain, this was very important. Architecturally, the effect was also a pleasing one.

Q: What was the reason for wanting the brick?

A: Purely political. Pressure from the masons' union and the association of masonry products.

Q: Did you find a great deal of pressure from President [Lyndon] Johnson when you were in Southwestern District?

A: Personally, no. Certainly the White House got into this brick question, and he was definitely instrumental in selecting Houston as the location of the Manned Spacecraft Center, but that decision had been made before I arrived.

Q: Did you think that was the best location?

A: I think it was as good as any. I don't think it would have been possible to say that any one location was better than all others. I think the decision to spread the program across the country was proper. Certainly the community in Houston with the nearby schools and other technical centers made it a good choice. No question in my mind, the choice was political; but I don't know of any reason why another site would have been better. It was fairly centrally located in the country with good transportation and in a mild climate, all of which were desirable.

Q: I believe that General [Daniel A.] Raymond in an interview said that he was in Mobile with some NASA construction responsibility. And that, as he recalled, the first time he really got to know you was in consulting over the NASA programs and similar problems that you both might be having. Do you recall this kind of coordination?

A: Yes, I actually visited them. He had responsibility for the Huntsville program, which had firing stands and things of that sort for actual test firing of some of the propulsion systems. He dealt with a very strong individual, Wernher von Braun, who had his own ideas because he was more or less the father of the space system. I did, as you say, talk to Raymond and others in Mobile about some of their activities.

There were also other activities in the civil works programs. I remember at least one or two visits there in connection with that program. But again, the overall coordination for NASA was handled by Hayes in Washington. We used to have meetings at various places—the Cape, Huntsville, and other places where those of us involved in the program could discuss mutual problems and coordination. My memory is that these were primarily sponsored by Hayes and were very useful in helping us in our approach to similar problems. I think there was better coordination within the Corps on these activities than there was within NASA because it was a new organization of individual fiefdoms that were not as closely connected and coordinated.

Q: Were there other important military projects you had?

A: There were a number of military projects in the Albuquerque District. They were primarily for the Air Force, but some were for the Army. There was other military construction for the Air Force in the Fort Worth area—at Carswell Air Force Base and other bases in Texas and Oklahoma. There was a considerable amount of work for the Army, particularly at Fort Hood, Fort Sill, and Fort Bliss, but no large or overly significant individual projects such as the Manned Spacecraft Center for NASA.

The single most important civil works project was the start of the construction work on the Arkansas River navigation project. In terms of individual projects, the NASA project and the Arkansas River project were the two major activities, although we had a fairly large civil program not connected with the Arkansas program. Work on a number of individual dams in Texas, one or two in New Mexico, several in Oklahoma, and flood control in San Antonio and Houston, I remember, were all going on at this time. Again, the major civil activity was the initiation of actual construction on the system of locks and dams for Arkansas River navigation.

Q: You mentioned, in regard to the Arkansas River, instituting critical path scheduling there. Would you like to say more about that?

A: I guess that was more self-preservation than anything else. General [Robert] Fleming, who preceded me as division engineer, in planning the Arkansas River project, had indicated his feeling that the project could be completed by—I can't remember whether it was 1968, 1969, or 1970. Do you have the figure?

Q: I don't have that right here.

A: We'll have to check this. But he had made a general commitment to the congressional delegation, principally Senator [Robert H.] Kerr and Senator [John L.] McClellan, that he thought the project could be completed by a specific date. If memory serves me, it was 1970.



Opening bids for the first lock and dam of the Arkansas River Project, October 1962. Col. Charles Maynard, Little Rock District Engineer, second from left stands beside Brig. Gen. Carroll Dunn, Southwest Division Engineer, and Lt. Gen. Walter K. Wilson, Chief of Engineers .

Within a few weeks after I arrived there, I attended a meeting of the Arkansas River Basin Development Association in Tulsa. At that meeting I met Senator Kerr and Senator McClellan for the first time. Senator Kerr turned to me and said, "Well, young man, we're glad to see you here. We're glad to have a native of Arkansas available and interested in this project. Your predecessor indicated that this could be completed by 1970. If you can complete this more quickly, I promise you that you can be governor of Arkansas or Oklahoma, either one that you'd like."

I responded to the senator that my problem was not the desire to be governor of either state—although I was an admirer of both—but that my real problem was determining not whether the schedule could be beaten, but whether it actually could be accomplished as General Fleming had outlined. My first effort would be to determine what we could do to hold to his schedule.

With that background I decided to do an overall planning study of the total project and instigated it through the division office. We let a contract to a Texas Instruments subsidiary to make a detailed study and develop a detailed critical path schedule of all activities in connection with the project, including land procurement, bridge and road relocations, design, completion of planning, as well as construction schedule. As I remember, we had some 5,000 events that were involved in putting this all together. As a result, we were better able to correlate the schedules for the various project segments.

One result was the elimination of one or two of the original proposed dam structures. We were able to determine that, by a small change in land acquisition and reservoir level at several of the dams, we could eliminate, as I remember it, two dams in the 432-mile channel. We put this all together in one plan and followed up with a detailed listing of annual funding requirements to go along with this schedule.

By the time we finished this study, we had a very good outline plan as to what could be started when, what its schedule for design and construction had to be, and what the funding requirements were year by year for the entire project. Based on this, we could forecast our funding requirements in the annual Corps' civil works budget.

After I left Dallas, these continued to be the schedule and funding requirements. The project was completed with navigation available to Little Rock in 1968, to Fort Smith in 1969, and to the head of navigation in 1970 as planned. And we were within the budget figure of \$1.2 billion. This was the original forecast for the cost of the project. I believe it was actually completed with something like \$100 million under the original estimate and within the 1962 time schedule.

As I viewed it then and as it continued after I left in 1964, this planning, done eight years before the project was completed, was a tremendous advantage to the program. I had questions, both while I was there and later, as to whether or not the budgeted amount of money was required. In several years it amounted to over \$100 million, which, in terms of the total civil works budget, was an appreciable figure in those days. The question was whether that figure could be reduced. My answer always was, "Yes, we can reduce it to whatever you want, but we can't maintain the schedule if we reduce it."

So having this detailed plan meant that there was a firm commitment to a schedule and to the funding required to meet that schedule. As far as I know, certainly as long as I was there, the funding was available. Because the project was completed on schedule, I assume it continued to be funded as forecast. I think this type of planning was very helpful for that project.

Whether or not it would be a good idea to have such a schedule for every Corps' project is a matter of policy because there are many political factors involved. In any administration as well as in the Congress, there are always questions as to where the money available for civil works funding is going to be allocated. Having one project that, in effect, gets priority sometimes affects the distribution of funding to other projects.

I suspect there was less than enthusiastic acceptance in some quarters of the fact that we had put a strong claim on a given amount of money for any one year. That meant this project had to be taken care of and other projects might not receive the funding that other people might have desired. But for that particular project, I think it was an excellent idea. It proved to be both accurate in its forecast of time and cost and also gave us the opportunity to plan realistically and to complete it over the eight-year time frame.

Q: Are you aware of other instances where this was used then or later?

A: I'm not aware of any. It may have been used in the Tennessee-Tombigbee project, but I don't know.

Q: And you thought that method may have been from Polaris?

A: It originally came out of the Navy's Polaris program.

Q: And you became aware of it at CEBMCO?

A: Yes.

Q: How did you feel after this initial meeting with Senator Kerr when he offered you the governorships of two states? You already had some strong political figures in Texas that you had to deal with like Johnson and [John] Connally and others.

A: I was aware of political reality, of course, from my service in Washington. But I realized that I had to have something more than guesswork to use in talking to these people. I had to have factual information that I could rely on in dealing with them, because the pressure was always, to "get it done." Of course, Senator Kerr didn't live a year after that time, but Arkansas Senator McClellan picked up the ball and continued the close Senate interest in the program. It was essential to have factual basis for commitments as to what could be done.

Q: What would you see as the most challenging aspect of the Arkansas River system?

A: Well, I think the most challenging part of it, other than the scope and complexity, was the problem of dealing with a heavily silt-laden river. We were trying to develop and maintain the channel without excessive dredging. I had a number of studies done—model studies at WES at Vicksburg—for each of the major structures to be sure that the alignment of the channel was the best we could devise.

We looked at the effect of the major dams upstream, such as Keystone and Eufaula in Oklahoma, to see how much silt they would remove in their impoundments of water. Technically, the biggest question really was how to establish and maintain the navigation channel. We had a 9-foot authorized depth of channel. I had the design made so that the sills of the lock were set at 12 feet. This meant that if ever there was a need to deepen the channel, the locks would have already been established so that they could provide a 12-foot channel without major revision.

Q: I wanted to ask you about the Trinity River project. In 1962, when you first got to the Southwestern Division, a study of the whole project that had been started in 1958 was completed. I guess it was subjected to congressional review. One thing that the committees in Congress objected to was the navigational features of the project. I'm wondering if you can comment on the project in general and how it fit in. I guess you would say it was a less important project than the Arkansas project.

A: It was somewhat different. Basically, the Trinity River (so-called canalization project) was primarily a navigation project with very limited flood control benefits. It, of course, was strongly supported by the local interests as represented by the Trinity Basin Association in Texas.

The study was, in my opinion, a good one and a worthwhile project. It was reviewed and approved, after some revision, by the Board of Engineers for Rivers and Harbors [BERH]. It had, I believe, a good economic basis.

There were some special factors involved. A large number of bridge relocations would be required. Through some means that I don't remember exactly, without the project ever being authorized by Congress, there were several appropriations that allowed bridges then being built on new highways to be built with final clearances so that they wouldn't have to be raised if the Trinity River project became a reality.

The project was politically controversial. This controversy involved both a very strong disagreement by the railroad interests and considerable in the way of environmental questions. These had been raised late since [environmentalists] had become more active at about the time that this project study was finished. I don't remember all of the details, although the study did indicate a favorable economic ratio based on the parameters under which we had to operate.

I remember one specific issue that was a disappointment to me. I felt that one of the major types of traffic that was likely to move on the proposed waterway would be coal. Even at that time, I had the feeling that we were not going to be able to continue to use natural gas as primary fuel for power production in the area. I thought that over the years natural gas would become too expensive to be used for power and would better be used for other manufacturing processes.

Therefore, there was a good possibility that coal could be mined in the Oklahoma–Arkansas area and be barged up the Trinity. There also would be movement of lignite, which had been detected in the Trinity basin. However, we were not allowed to use these two fuel sources in our economic prediction because they weren't already moving by rail. Under the rules, we were limited in our consideration to changes in transportation mode rather than movement of new products.

I felt that the project itself was, in concept, a good one because two very strong economic communities existed on each end of the project—Houston at the Gulf and Fort Worth–Dallas area in the upper reaches. These I called traffic generators.

Such large economic communities naturally had to be tied together by transportation, and there was a fair degree of certainty that bulk materials would move between the two. For that reason I felt that traffic forecasts were probably likely to be exceeded.

The increased traffic over that predicted did develop on the Arkansas River, but for a different reason. There it was movement of materials into the Little Rock and Tulsa area, which is not as big economically as the Fort Worth–Dallas area. Also, a good deal of bauxite ore moved into Arkansas, which had not even been considered in the original forecasts.

In summary, I felt the study of the Trinity did recommend a viable project. I hasten to add, though, that whether it should ever be built was properly a political decision that had to do with whether that amount of money should be allocated to that particular type of project. But under the terms or basis for planning, it met the criteria and was a viable project.

Q: What about the railroads' objections?

A: Railroads, understandably, have always objected to the development of river navigation. This was no different.

Q: In seeing that the development would handle traffic, and perhaps more than projected, did you think this would be in addition to whatever the railroads could carry?

- A: Naturally, when you have four types of transportation—air, truck, rail, and water—each one will tend to carry those things that they can handle best; and for water these are bulk commodities. Whatever bulk commodities were moving by rail would tend to move instead by water, and for those that weren't then moving at all, a viable means would develop. I felt that among the latter would eventually be coal, moving to fuel power plants that would be located along the river to supply that portion of Texas.
- Q: What about the environmentalists at this point? I know they became much more intense in their opposition to the project later in the 1960s, but what was their position at the time you were there?
- A: There wasn't any strong objection at the time. That came later.
- Q: You were simply referring to something to come. Basically, the objections at this point were more economic.
- A: We heard arguments over the rules under which the projects were formulated: arguments about the competition with the railroads; arguments about the amount of money the local interests would have to supply under the formulas allocating cost.
- Q: Did you go to Washington frequently to testify about these projects?
- A: I appeared annually before the congressional committees for both authorization and funding requirements for civil works projects throughout the division. I also was a member of the Board of Engineers for Rivers and Harbors and as such attended their meetings. So there were frequent trips to Washington involved in those two activities.
- Q: What about the Texas City project that dealt with hurricane flood control?
- A: There were major developments along the Gulf coast. Following the hurricanes of the early 1960s, plans were made for improving hurricane protection in Texas City and other areas, and for improving the Galveston sea wall as well as other projects.
- Q: Was that very extensive?
- A: It was in the millions of dollars. I don't remember at this point just how much, but the Galveston District did work all along the Gulf coast. Involved were levees, flood walls, and flood gates and, if memory serves me, there was at least one pumping plant, in the Chocolate Bayou area near Texas City.
- Q: Do you recall outstanding civilians who worked with you when you were in Dallas?

A: We had a good group. Dick Fields was the chief of engineering and did a very fine job. As I remember, he had originally come out of the Missouri River Division, but he was already there when I arrived in Dallas. I brought in a new head of construction George Andrews, from the Little Rock District. He had worked for me in the Titan II program. We had a good hydropower design section in the division office because of the high number of hydro plants we were building throughout the division. Roy Penix, who was the executive assistant in the division office, was primarily involved in dealing with political and public relations affairs. He knew the area very well, particularly Texas, Arkansas, and Oklahoma, and was extremely valuable in dealing with local interests. Joe Hoffman was legal counsel and a great asset.

Q: Would you have any comments about your district engineers during this time period?

A: Well, most of the time Colonel Charles Maynard was the district engineer in Little Rock. Colonel John Morris, later Chief of Engineers, was the district engineer in Tulsa; Colonel Frank Koisch in Fort Worth. Basically, those were the three most active districts. I dealt with all five of them, but Galveston and Albuquerque were relatively small districts. I think we had good district engineers. I used a system of field visits. I guess I was out close to half the time and tried to get to each of the district offices fairly frequently as well as to the major jobs in the field. While I was in Dallas, I was also a member of the Mississippi River Commission. This involvement was very interesting and significant to me because I had grown up near the Mississippi River. The experience at WES had also added to my detailed knowledge of the lower Mississippi River. I enjoyed being a part of that activity and association.

Eighth Army, 1964–1966

Q: Your next assignment was to a staff position in Korea, correct?

A: Yes, I was assigned to Eighth Army as the deputy chief of staff of the Army, not a usual assignment for an engineer general officer. My understanding from General Wilson, when he told me about it, was that he wanted to get engineer general officers in branch immaterial positions and in military assignments. With this opportunity, he had nominated me for the assignment.

Q: What would be the advantage of doing that?

A: Getting the engineer officer better known throughout the Army and overcoming some of the feeling that engineers were different, or thought they were different.

Q: That's the feeling the engineers had?

A: I think some people in other branches perceived that or thought they did.

Q: OK. I see what you mean.

A: I don't know all the details. I was a little surprised when the assignment came.

Q: Did you have any preferences as to where you would have liked to have gone, other than Korea, at that point?

A: I would have liked to have stayed in Dallas to finish some of the things I had going on there.

Q: You left early?

A: A little early. I came in February 1962 and left in July 1964. My reassignment was essentially eight months early. The assignment, however, was an interesting one. A major activity other than the ordinary duties was serving as the principal military member of the team negotiating a Status of Forces agreement with the Korean government. The senior negotiator and the diplomatic representative was Philip Habib,



Brig. Gen. and Mrs. Carroll H. Dunn leave Korea, January 1966.

whom you've been hearing a lot about recently. Phil and I, over a period of about one and a half years, negotiated the agreement with the Koreans. This type of assignment gave me an opportunity to meet a lot of the Koreans as well as our own people from the diplomatic community. From an engineering viewpoint, the assignment was not significant. But from the standpoint of association with the rest of the Army, it was an interesting and a valuable experience.

Q: You recognized that that was what General Wilson was trying to accomplish?

A: Oh, yes—with which, incidentally, I agreed.

Q: What about developments in Vietnam at that time? Were they being followed from where you were?

A: Yes, through intelligence reports. I was generally familiar with what was going on but not directly involved.

Q: Do you have anything more you'd like to say about that?

A: No.

Director of Construction and J-4, Military Assistance Command, Vietnam

Q: Your next major assignment came in February 1966 when you went to the Directorate of Construction in the Military Assistance Command, Vietnam [MACV]. How did you feel about getting that assignment, and what do you know about the origins of your selection?

A: Well, I wasn't very happy about it at the time, I must admit. But it was a challenge and one to be met. You referred to the background of my selection. There is a lot about this I don't know. Some of the people who do know would be General [William] Cassidy and General Clarke, and I guess General Hayes was somewhat familiar. Basically, I had heard in late 1965 that there were problems with the construction program in Vietnam.

I heard that there was interest in setting up some type of coordination and control in Vietnam, rather than having each service dealing through its chain back to Washington for construction requirements. In December of 1965, General Hayes, who was at that time director of military construction, came to Korea, and we talked briefly. I got the impression from him that, while I might have been considered for the assignment, that proposal was no longer active. It was so problematical that I said nothing to anybody about it.

Then in about mid-January, a classified back channel message came to General [Dwight] Beach, the U.S. commander in Korea, saying that I had been selected by the Secretary of Defense to go to Vietnam to be in charge of construction. Orders would be issued returning me to Washington for consultation and then for assignment to Vietnam. This came in on a Wednesday morning, and I was supposed to be in Washington the next Monday.

My wife was with me in Korea. We had anticipated a two-year tour starting in July 1964 and hoped to get back to the States in June 1966 in time to see our son graduate from West Point. So, although I had heard a few rumors, there was nothing to indicate this early change in assignment.



Maj. Gen. Carroll H. Dunn was assigned to the Military Assistance Command in Vietnam.

General Beach called me when the message arrived. Neither of us felt that there was any point in taking issue with the proposed assignment. He indicated in his response that I would be available.

My wife and I packed quickly and left that weekend for Washington. There were some major family disruptions. After all, we'd been overseas 18 months, and this represented an additional extended tour. It came as quite a shock to my wife. I think of all my Army assignments, this was the only one that ever truly shocked her, and she found it a little hard to take for a while. But, as a good soldier's wife, she did; and we came back together to the States. We got her established in an apartment in Arlington, Virginia, while I was spending about ten days in conferences at the Pentagon getting ready to go to Vietnam. I arrived on the 8th of February in Vietnam.

As far as background is concerned, I understand there was considerable discussion within the services and the Joint Chiefs of Staff. Each of the three services designated an individual for the job in response to the Secretary of Defense's requirement for what was called a "construction czar." The secretary apparently left it to the Joint Chiefs of Staff to make a selection.

As I understand it, attempts to make a selection proceeded, with each service holding out for its own nominee. Apparently, I was the only one of the nominees who was known to more than one of the services. Because of my association with the Air Force in Greenland, the ballistic missiles Titan II program, and the Southwestern Division, finally a compromise was reached, with me being designated. So that, as far as I know, is the background of how I happened to be chosen. All this went on without my being aware of it. *Time* magazine ran me down while I was on a few days' leave in Illinois and carried a story about the assignment.

Q: You referred to this position as being the "construction czar."

A: That was somebody else's term, not mine.

Q: Yes, I know. You were also characterized at one point as [Robert] McNamara's "straw boss" in Vietnam. You had indicated earlier that this position was an attempt to coordinate requirements in Vietnam rather than have each service's program go back to Washington through its own channels. You don't have to answer this right now, but I am interested in McNamara's attempts to control the situation. How personally involved was he?

A: Oh, I have impressions. Certainly there was, in my opinion, far too much control from Washington in everything that went on over there—not just in the construction program but in the detailed approval of individual air targets, [involvement in] details of deployment of troops, and many other aspects that made this war far different from any other war. Of course, this was made possible by extraordinary communication facilities.

As to the construction program, during the early days of U.S. involvement, when Americans were simply serving as advisers, each individual service developed its construction requirements and passed them back through its own chain of command. We were operating in a peacetime system with construction projects going through the appropriate services; through DOD, OMB, and to the Congress for approval, authorization, and funding; then back through a very extended chain; which obviously wouldn't work with the short-term demand of a wartime situation.

The primary difficulty in Vietnam, as requirements with the increased U.S. strength in Vietnam, was the necessity to set priorities because of the extremely limited construction capability in country. There was one construction contractor combine, then in the process of being increased in capacity. There was also a limited engineer troop construction capability as represented by a few Army engineer units and Navy seabee battalions.



Maj. Gen. Carroll Dunn, J-4 (second from left) and Brig. Gen. Mahlon Gates, Director of Construction (center) inspect a site in Vietnam, 1966.

The real problem became one of allocating the resources so those things that were of the most benefit to the Military Assistance Command in Vietnam were the ones that would get done rather than those that each individual service might request and get funded, and that then would result in a claim on the limited in-country resources. Unquestionably, there was need for someone in Vietnam to coordinate the construction activity. This revolved around the fact that there had to be established a series of priorities and a means by which controlled allocation of limited resources could be carried out. That essentially was my mission and the basis for my assignment to Vietnam and for the establishment of the construction directorate.

The directive from DOD sending me to Vietnam, in effect, delegated to me the authority to determine requirements and set priorities. This bothered General [William] Westmoreland a little, and in one of my first conversations with him, he alluded to the fact that I had been given this authority by the Secretary of Defense. My response to him was, essentially: "I know for whom I work, and obviously the priorities that are going to be set are those which you feel are the ones needed." After that very brief conversation, there was no difficulty whatsoever.

While I had known General Westmoreland and we'd had some brief association, I had never worked directly for him and certainly did not know him well. However, we did establish a good working relationship. In the numerous discussions I had with the services about who would get priority for what, what project would be done first, and how the resources would be allocated, never once did he fail to back me up completely in the decisions that I reached. I remember vividly spending all of one day in the Da Nang area at his instruction trying to reach some settlement of the conflicting interests between the Air Force and the Marines over the development of Da Nang Air Base. The basic question was whether priority effort would be on the additional runway, which the Air Force wanted, or on parking aprons and other facilities for the Marine aircraft that the Marines wanted. Like Solomon, I "split the baby."

This was a constant problem throughout my 20 months in Vietnam. We were given a lump sum for each service in the theater with the authority to determine our own requirements. The remaining problem was allocating the construction capability rather than getting authority for a project.

The first task for me and [General] Dan Raymond, who was already there and who became the deputy director of construction, and the other people in the construction directorate, was to get a handle on what each service required. We then had to work up an integrated priority list so that the resources of the civilian contractor, working under the Department of the Navy, and the resources of the available military construction forces could be allocated properly.

Generally, Navy seabees worked in the I Corps area for the Navy and Marines, and the Army worked in the other corps areas for the Army and the Air Force. But there was some intermingling of units. On at least one occasion, Air Force construction-type detachments called "Red Horse" units, Army engineer units, and the civilian contractor were all working on the same air base that had, at that point, a very high priority to become operational.

This allocation of resources was the primary purpose of the construction directorate and, in my opinion, was absolutely essential to getting on with the program. I would say that this was probably my major contribution to activity in Vietnam. Not too long after, in July, I was appointed the J-4 of the command but continued to exercise general guidance to the construction directorate which General Raymond then took over as director of construction.

Q: In his interview, General Raymond pointed out President Johnson's decision not to call up the National Guard and Reserves, depriving the Army of its normal construction base.

A: And experience.

Q: And experience. Do you have any comments on this?

A: No question that this was a vital thing. When the first Army engineer units went over, they were quite well trained, and had capable officers and noncommissioned officers. They could do what a construction battalion was supposed to do. But, because of the one-year rotation policy, after the first rotation, the command had lost all the best trained and most experienced NCOs and officers.

As a result, a unit that arrived there, say, in the fall of 1965, and did an outstanding job for the first year, became a totally new unit when the leadership all rotated out at the same time. The lack of a call-up of the Reserves or National Guard removed the ability to feed experienced personnel into the system. With a continued rotation, every year there was, in effect, a new unit that did not have the capabilities of the unit that had been there, even though it carried the same number. It was composed totally of new personnel without the experience of the previous people.



Maj. Gen. Carroll Dunn, J-4, Military Assistance Command, Vietnam, 1966.

As we began to get draftees and lost the experienced Regular Army personnel, there was a major adverse effect on the capability of troop units to execute construction. This didn't mean they didn't keep trying, but it certainly limited their effectiveness until they experienced very rapid on-the-job training simply by being forced to take on the work.

Q: This forced you to rely more on civilians, did it not?

A: Yes. It meant that we did rely heavily on the civilian contractor. So far as I know, this was the first time that the U.S. had ever used a civilian contractor in an active theater of war. There were times when the civilian contractor—the combine of Raymond International, Morrison-Knudsen, Brown and Root, and J. A. Jones—had as many as 50,000 Vietnamese working in their construction forces under the supervision of several thousand Americans.

This required the contractor to have an intensive training program for the Vietnamese equipment operators and craftsmen. However, the failure to replace experienced service construction units, after the first round, continued to be a major problem.

Q: Would you agree with General Raymond's observation that troops were better equipped for road and airfield construction, whereas civilians were better suited to build ports and utilities?

A: No question about that, both by training and equipment. We had some Army port units that did a reasonably good job on small projects, but they simply weren't capable of taking on major efforts, such as the construction of the Newport facility in the Saigon River.

Q: How about the whole question of construction standards? Wasn't that a problem, and an issue of controversy?

A: Here again, there were several problems. While our forces were in Vietnam as advisers, there was a tendency to fix things up reasonably well for the long haul and for people to be reasonably comfortable in a debilitating climate, to say the least. As the requirements increased and the number of troops increased, it was physically impossible to maintain the same standards. This made it necessary to establish new standards—but with considerable difficulty, both in changing from one standard to another and in convincing the contractor that there was a change.

There were also interservice rivalries as to requirements. For instance, the Air Force insisted that they had to have a higher degree of comfort for their pilots so that they would be rested and ready to go. The pilots tended to stay in one place so it was a little easier to justify building to a higher standard than it was for a cantonment out in the jungle when you didn't know how long the unit would occupy it.

So there were problems both in establishing and in maintaining standards, and certainly there were gross deficiencies. However, I think these standards were established fairly early in the game, and a reasonable job was done in hewing to them. Although there is no question that this was the war where we took the comforts of home to the battlefield to a much higher degree than I had ever seen in World War II or Korea, including having hot meals on the front line and ice cream and reconstituted milk and PX facilities and cold drinks. I fought 11 months in World War II and never saw a Coke or its equivalent; yet these were readily available in Vietnam.

Other things such as fresh meat and fresh vegetables and refrigerated storage in a very hot and humid climate are items you just hadn't thought about in previous wars. This standard of living added materially to the construction requirements and to the support

requirements as well. As to electricity—we never calculated electrical requirements to the degree that we did in Vietnam. Then we had to consider the question of maintenance and the need to have a post engineer force—also a new addition to active combat theater requirements. It was a different war in more ways than just jungle fighting and drug problems.

Q: What would you say about the functional component system?

A: It didn't work. Just why it didn't work is a matter of conjecture. In the first place, we had an idea but we never procured it. Second, because it hadn't been procured, it really hadn't been tested. While theoretically we could order a battalion camp, in reality we couldn't. Somebody had to put that together; the procurement and the equipment never got to Vietnam in one shipment. The shipping situation would have made it very difficult even if we had had functional components in stock. In my opinion it would have been much better to have standardized components that could be bought and shipped to Vietnam where they could have been assembled in any combination or configuration as needed. This would have made more sense than the component system as it was originally conceived. My understanding is that there's been a lot of work done on this since Vietnam. I'm not up to date on what has happened in the last few years.

Q: With the Vietnam experience in mind, perhaps.

A: I would hope so.

Q: But no one's talked to you about it?

A: Right. We did prepare some after action reports, particularly a report prepared by General Raymond. And later there were a number of studies at the JCS [Joint Chiefs of Staff] level on this subject and on control of construction in an active theater.

Q: Were you involved, say, in the JCS study?

A: I met with the people making the studies, and I critiqued some of their results. I was not deeply involved, although he [Raymond] was.

Q: What about the Seaman Board in OCE? That was in February 1968.

A: Again, I was aware of that and met with the group and provided some input. I must admit that at this point my memory is hazy on the actual results.

Q: I don't know if you'd have any further comments about procurement and its problems in relation to the job you were trying to accomplish in Vietnam.

A: Well, of course, the Corps of Engineers was not responsible for procurement. The Navy, both itself and through the contractor, was primarily responsible for procuring those things needed by the civilian contractor. Procurement for Army units was handled by the Army system through direct requisition from the U.S. Army, Vietnam. Certainly there were procurement problems throughout. Procurement of real estate, for instance, was a requirement. In the final analysis it fell on the director of construction. Yet, the procedures and people weren't there to handle it. If you look back to the original real estate agreements with the Vietnamese, they were supposed to furnish the real estate as needed by U.S. forces. However, this was [done through] small advisory detachments and was never intended to handle the situation as it developed with the massive requirements for land and facilities as the war expanded. My view is that, for the first time and unfortunately at the wrong time, we continued to try to use peacetime systems in a wartime environment, and that simply doesn't work.

Q: Why was that so?

A: I would have to say that, largely, that was Mr. McNamara's contribution to the war. We became managers and bookkeepers instead of fighting the war.

Q: And all efforts to change it didn't work?

A: Yes, there was a change, for instance, in the construction program procedures when I went there. In effect, \$1 billion was appropriated with authority in the theater to decide what should be built. Immediately, however, the effort started to bring that control back to Washington to make those decisions. For instance, we still had to keep military construction funds separate from operation and maintenance funds. In previous wars, funding was for operation and maintenance, and we didn't have 15 pockets in which we had to keep various accounts. That just indicates the fiscal restraints that were imposed.

Q: Was a lot of the coordination required through the Southeast Asia Construction Office in DOD?

A: There was such a group in DOD, which Noble established. He was our contact in Washington. There also was a small group in OCE that followed up on any requirements that we might have. They tried very hard to be of assistance and to furnish help and support. As far as I know, these groups worked reasonably well, but it was a complicated system. Essentially, I can only describe it as an attempt to use peacetime bookkeeping and accounting methods in a wartime environment. In effect, it was

peacetime procurement of real estate. There were no people trained to do that, so we took any people then we could find and made them real estate experts overnight. Obviously, they weren't.

Q: What would you say about the quality of the engineer troops that were in Vietnam?

A: My view is that the early troops were fine. As I have indicated, every unit was turned over in its entirety by a yearly rotation. This very much decreased their usefulness during that rotation period. Gradually, of course, this effectiveness increased. As far as I am concerned, the training of the individual soldier or the individual officer was all right. However, essentially all of our replacements came in at the lowest level, both officers and enlisted men. That was the replacement system.

Q: Did you have much contact with Major General [Robert R.] Ploger when he was in Vietnam?

A: Yes. Ploger was the USARV [U.S. Army Vietnam] engineer, just as the Navy and Air Force each had an engineer. I had a good deal of contact with him in relation to the Army's requirements and capabilities. For instance, I got from him the Army's construction requirements and issued to the Army—in effect, to him—the construction directives that allowed them to expend funds for the approved projects from their list of need. At the same time, we allocated the construction effort, whether it be an Army troop effort or whether it was to be done by the civilian contractor. This required continued liaison.

His responsibility was to determine Army requirements, and mine was both to approve those and to fit them into the overall program. Once assigned the mission and the authority to build, where Army troops were involved, he furnished the resources to do the actual construction.

Q: Did you have much basis for assessing the allied engineer troops that were in Vietnam?

A: The only allied troops were the Vietnamese and the Koreans. I was responsible for advising the Vietnamese engineer element. As a result, I kept in fairly close contact with what they were doing. I had been familiar, from my Korean assignment, with the Korean engineers and their capabilities. Essentially, they satisfactorily executed those things which were assigned to them. The major facilities were provided by using either the contractor or U.S. units. Essentially, the allied troops took care of themselves as far as housing.

Q: You left Vietnam in the fall of 1967. Can you recapture what you thought about how the war was going and American prospects at that time, forgetting what actually did happen?

A: First, I have to say that I was distressed when the decision was made to move American troops into Vietnam in 1965. While I was aware of the Gulf of Tonkin resolution because I read intelligence and back channel messages in Korea relating to what was going on in Vietnam, I was distressed that we were taking on this mission. I had been somewhat familiar with previous studies, including the report of the team that President Eisenhower sent to Vietnam to assess what we could or should do to help the French. The advice as a result of that mission was, in effect, "Stay out of Vietnam!" I felt very strongly that that was still the right advice.

So, my first reaction was distress that we were going ahead and taking an active part. After I'd been in Vietnam for a few months, I came back to Washington—in late May or early June of 1966—to report to the Department of Defense on construction activities and to continue some of our planning for future requirements. While there—I was only in the States about ten days—I began to realize that the public perception of the war was changing.

When I got back to Vietnam, General Westmoreland asked me what was going on in the States; what was my perception? My response to him was that I thought things would be all right if the people would just stay behind us, but I saw evidence that questions were beginning to be asked and the support for the war wasn't (comparable to) that existing in previous wars. All that to say that my first feeling was that we should never have been there; second, there was not universal support for the effort. This was reinforced by the presidential decision that we weren't going to change the national economy and go on a wartime footing, but would have the "guns and butter" approach. I felt it impossible to do both.

With this background—let's get back to how I felt in late September 1967. We were reaching the level of effort that had been approved. It was very clear from the way things were going that additional effort was needed. And I questioned whether it was going to be furnished.

There had been limits set on the war and how it would be fought. The restrictions such as a ban on invasion of North Vietnam and constrained activity for use of air attacks again set limits such as we had seen in Korea. My view was influenced by the fact that I had become convinced that we had made the political decision, possibly without fully realizing it, that we weren't really going to fight the war to win it. In effect, a theory of gradualism, as in Korea, had developed, which, in my opinion, foredoomed our efforts.

I thought the difference depended on whether or not the Vietnamese themselves could ever reach the point where they could take over. The major effort of the U.S. forces in the approach to the Vietnamese, both militarily and politically, was to try to increase their input into the war. I felt at this point that what would actually happen was going to depend largely on whether we were successful in changing the hearts and minds of the Vietnamese people to make them take on, in full measure, their own responsibilities.

Looking back on it, I was not overly surprised at what happened in the early 1970s, although I would not have foretold the disaster that actually occurred. I would summarize by saying it was the wrong war at the wrong place. And we did a very poor job, as a nation, of making up our minds, once we got in it, to do what was necessary to win it. Consequently, the results were not too unexpected. That is not a criticism of individuals, particularly those in Vietnam. It's a question of the national will.

We expended a great effort and lost many lives and resources for a very, very limited result. I did anticipate that our construction of ports, roads, and airfields would represent a material asset to the Vietnamese after we were gone. Obviously, I didn't mean the North Vietnamese!

Q: But it nevertheless has been an asset.

A: Probably.

Q: Can you think of any other aspects of the whole Vietnam situation that you'd like to touch on?

A: Well, I think, essentially, we weren't prepared for what we took on. We decided to send troops before we were prepared to receive them. And we were very, very hesitant to discard peacetime methods and to get on with decisive actions. I think this was the big deficiency of the Vietnam experience. There was a feeling when we became involved that all we had to do was growl. Obviously, this just didn't work.

Q: Are there any individuals who haven't been mentioned who were outstanding contributors?

A: I think everybody who was there did everything they could to make the best of a bad situation. I don't have any criticism of or desire to single out any individual. A lot of good people did a lot of good work, but the short tours and constant change of personnel were very adverse factors. Yet, from my experience in World War II, I have to say that I think the one-year rotation was a proper policy, particularly in the environment of Vietnam and in view of the fact that a relatively few were carrying the whole load. I think it would have been wrong to have kept people longer. So far as I

know, only general officers stayed longer than a year. This provided some continuity. Nevertheless, yearly rotation had a distinct adverse effect on the war.

Military Construction, Office of the Chief of Engineers, 1967–1969

Q: I bet you were happy to be going back to Washington.

A: Yes, I was happy to be getting back to my family, and I was not averse to going to Washington. The change, however, came as a surprise. I had talked to General Westmoreland a few weeks before—approximately six, I guess—about how long he wanted me to stay in Vietnam, and he had asked that I plan to stay at least until sometime in 1968. This was what I anticipated; finishing at least two years in Vietnam. The request for my reassignment to OCE as director of military construction caught me a little bit by surprise, but General Westmoreland allowed me to leave.

Q: Again, do you have any insight into the background of this assignment?

A: I don't know what really took place. Of course, other requirements were coming up, and I replaced General [Andrew P.] Rollins, Jr., who then went to Vietnam as director of construction to replace General Raymond, I believe. I assume that the job at OCE was open, and General Cassidy felt that it was time I was coming home and that this was a good assignment for me.

Q: So that for a period of roughly 21 months you'll be director of military construction in OCE, then become deputy chief, and then go to the Defense Nuclear Agency. The rest of your Army career will be spent in Washington, although you don't know that at the time. In the Directorate of Military Construction from 1967 to 1969, with what major areas were you involved?

A: Of course, the first thing was catching up on where we were. Shortly after I got to OCE, I made a trip to the Middle East to review the work being done by the Mediterranean Division in Ethiopia, Saudi Arabia, Iran, Turkey, and Italy. Out of that came a question that General Clarke and I discussed at some length related to our continued activities in Saudi Arabia and just how heavily we should be involved. We were at that time building communication facilities, TV facilities, and later some military cantonments.

I think the major activity was attempting to keep the Army requirements for military construction, other than in Vietnam, moving forward. The continuing support of Saudi Arabia was somewhat of a drain on our personnel resources, although not on funding,

since the Saudis provided the total funding. Later on, toward the end of this period, the Post Office [now the U.S. Postal Service] construction task was assigned.

One of the early actions was the establishment of the Construction Engineering Research Laboratory [CERL] in Champaign, Illinois. This idea had been fairly well developed but hadn't been finalized. Working out the final leasing arrangements for its support with the University of Illinois was required. There were also discussions as to possible reorganization and realignment of activities, but these were continuing questions requiring consideration and recommendations. In retrospect, I would say that the period was one (other than the support of Vietnam and the Saudi commitment) of routine actions without many new or major changes. I did become convinced that our small-sized nuclear power program was not going anywhere, and I worked to close it out. The small reactor nuclear power program really had no mission after the completion of the *Sturgis* as a floating power barge.

Q: At Fort Belvoir?

A: The final results were handled at Fort Belvoir, but the program had been ongoing since the middle 1950s. In Vietnam we had raised the question of using the nuclear power barge to meet a part of our electrical requirements. The U.S. ambassador, for political reasons, vetoed bringing any atomic power into Vietnam. Based on this experience, use of the *Sturgis* was to be a continuing problem.

Q: That was the basic reason?

A: That was one of the considerations. That, plus the fact that with all of the restraints, restrictions, and safety precautions related to nuclear power, there is no place on earth where you could not run an equivalent oil-fueled power plant more cheaply than you could a small nuclear plant. Therefore, the whole basis on which the program had started, as far as I could determine, had changed. And the current situation no longer justified the level of effort it required.

Q: Were you indicating, when you were talking about the Saudi commitment at the beginning, that this perhaps was a drain?

A: It was a drain on the Corps' resources at a time when we were restricted in availability of qualified people. While they were paying the dollar cost, we were still providing the trained people. The question was how long it could, or should go on. Later, while I was deputy chief, General Clarke and I protested to the State Department that this wasn't really an appropriate mission for the Corps. They insisted that, as a matter of diplomatic relations, as long as the Saudis were, [the State Department was] strongly in favor of

our continuing the operation. This led to the much heavier commitment we have today compared to that of the 1960s or early 1970s.

Q: The basic problem, then, was personnel?

A: You could see it continuing as responsibility to a foreign country, and we questioned whether this was the right thing to do.

Q: Did you feel that way about any of the other assistance programs that were going on then?

A: I think this case was different since it was more a matter of supporting a civilian economy rather than military support.

Q: Have you thought of any other programs in the same light?

A: I felt differently about the Post Office program that came later during my tour as deputy chief because this was a special need in our own country. In Saudi Arabia we were making what appeared to be a relatively long-range commitment to a foreign government, which is not a normal activity. Yes, if it was an emergency, but not on a continuing basis. That was what we were thinking about. The State Department, on the other hand—and I think appropriately—recognized the long-range implications in the Middle East. They felt that, if this was a service we could provide to the Saudis, it was important in the national interest. Therefore, our parochial interests concerning shortage of personnel and commitment of trained people and things of this sort were secondary to the overall considerations. That was the final decision, and that's the decision to which we adjusted. As I said, over the years our commitment has grown larger rather than decreased.

Q: What was General Cassidy like as Chief of Engineers?

A: What do you mean?

Q: How would you compare him in approach or method with the others with whom you worked so closely, such as Sturgis and Itschner?

A: Well, Sturgis, Itschner, Wilson, and Cassidy were all different in their approaches. I would say that Cassidy was more like Sturgis in terms of ability to delegate and let others take care of the details while reserving himself for the long-range picture. I didn't have any real problems in dealing with any of them. I recognized the individual characteristics, traits, and methods of operation. I had no major problems in adjusting

to what they desired. I don't remember any significant situation that should be mentioned.

Q: I suppose you would include Clarke in that group also?

A: Yes.

Q: Did you feel closer personally to Clarke than to the others?

A: Yes, basically, because we were about the same age and had similar experiences. Also, we had worked very closely together over the years. However, I had also worked very closely with Cassidy. For instance, he was in Japan when I was in the engineer section of the Far East Command. For a while, he was exec of the engineer section. As a result, I had known him quite well. But, Clarke and I were, as I said, much closer to the same age and length of service so that it was a different arrangement and situation.

Q: Now when you became deputy chief in 1969, was it more or less concurrent with Clarke's becoming chief?

A: The same day.

Q: You now continue (correct me if I'm wrong) with responsibility for military matters and also civil works.

A: Well, for whatever the deputy was assigned. With a single deputy, responsibilities really are across the board.

Q: Were you satisfied with your duties?

A: Yes. I would follow more closely the day-to-day activities, leaving the chief free to deal with the long-range aspects and the Corps' responsibilities such as meetings with higher levels of the Army, the Department of Defense, the Congress, and such.

Q: Was that the first time the chief's office was that way—that is, in 1969?

A: I don't remember when it became a one-deputy system—sometime between Itschner and Cassidy, probably under Wilson.

Q: Yes, I think it was under Wilson.

A: Clarke indicated that he wanted me to handle essentially the operation of OCE and the general day-to-day activities.

Q: Who was his executive then, do you recall?

A: [Richard F.] McAdoo. I can't remember who took over for me in military construction, but it was probably Dan Raymond.

Q: I don't have that. Now Koisch, who had worked for you in Fort Worth, came in as director of civil works at that time?

A: Yes.

Q: Did Clarke have any—probably not, since you both came in at the same time—say about who was to become deputy?

A: Oh, I think he had everything to say about it.

Q: And he chose you?

A: Yes, I assume so. It wasn't too illogical. I believe I was the senior officer, next to him, assigned to OCE. Anyway, it was totally his decision.

Q: Now environmental questions became quite major at this time and involved the Corps, particularly with new legislative requirements. I wonder if you can discuss the Corps' response to the environmental movement?

A: Yes. One of the things that General Clarke established was an advisory committee of environmentalists.

Q: The Environmental Advisory Board [EAB]?

A: Yes, this was his idea. I must admit I had some reservations about it. I still have mixed emotions about it. But, in the climate of the times, it was undoubtedly a good approach to take.

Q: Could you explain some of those reservations that you had then and still have?

A: My feeling was that if you appointed strong environmentalists, they would want to have an active part. They would not be willing to simply give advice and not see it followed. They would soon lose interest unless we took their advice, and I did not see how we could bring in an outside group like that and have them set policy for the Corps. I think we were fortunate in having most of the people who served—not in all cases—but some of them were broad enough people so that they recognized the inherent problems.

Q: Who, for example?

A: I don't remember names, but the people who were in the first group were, except for one individual, [open minded] enough to recognize that we truly wanted to have the benefit of their knowledge and experience. But they also understood that we were not always totally free to do whatever they suggested. I remember several discussions concerning the Cross-Florida Barge Canal and other projects that were then under way. Their view was that we simply ought to stop them.

It took us a little while to convince them that Congress and the executive branch were deeply involved in these decisions—not just the Corps of Engineers. Our job was to carry out the mandate given us. There were some frustrations in this relationship, and I was a little concerned as to whether we could ever have effective dialogue. We weren't going to be free to take the drastic actions that they were interested in having us take. It is a reflection on the very capable way in which General Clarke handled the group and the people who made up the group that some of my fears of a total adversarial relationship didn't materialize even though the potential was there.

If you didn't have these types of individuals—shall we say “well-labeled” environmentalists—then you didn't have credibility in the community because the feeling would be that you had “homogenized” environmentalists. We had a fine line to walk in finding people who were credible in the environmental movement and yet who were willing to work with “the enemy.”

I remember speaking at the annual meeting of the Audubon Society in Seattle. One of the senior officials of the society was on the Environmental Advisory Board. While we didn't all reach agreement, I had a very interesting time on a panel talking to about 500 members. I remember pointing out to them that, while they had a right to their opinions and to expressing them, they had to realize that they didn't speak for everyone and their views were not shared by everyone. There was more than one side.

The “typical little old lady” got up and said, “Well, if they were here, we'd speak for everybody.” I never did find out just what she meant by that. I think she meant, “We speak for everybody here.”

The point is that they still were a reasonably small crowd. Another point made was that we were meeting in an air-conditioned facility in Seattle that didn't even have any windows. Obviously, air changes were totally controlled by electrical means. At the same time, they were carrying on a big discussion about how the major dams on the Columbia River were an environmental disaster. I asked them where they thought the electricity came from to make this auditorium usable. They didn't have any good

answers. My whole point was just to try to get this group to look beyond the immediately obvious.

It is easy to list things that we should do, but most take for granted some of the benefits that come from things to which they object. It was a good exchange. Essentially, in my trips, I tried to represent General Clarke's position and my own as chairman of the rivers and harbors board, one of my ancillary duties. I had a very interesting two years in the assignment.

Q: Do you recall much about General Cassidy's position on environmental matters?

A: The pressures were not the same. I don't think any of us wanted to despoil the environment. On the other hand, most of us who came up through that period were committed to the fact that, if something was economically justified under the terms controlling at that time and Congress authorized the project, it represented an economic gain and was therefore a viable and desirable thing to do. The environmental movement simply added a dimension and additional specific criteria that we had to take into account. It soon became a major factor in project planning.

Then came the requirement for the so-called environmental impact statement. Nobody knew what it was, and the courts began to make determinations. The whole thing seemed to consist of determining how many feet of books you could include in a study to come up with an environmental impact statement. The main effect was to greatly increase the time it took to plan a project and to greatly increase litigation.

Q: Do you recall political pressures being particularly strong on the Corps to become more responsive environmentally, such as, perhaps, from Congressman [Henry] Reuss of Wisconsin?

A: I don't remember having any personal contact with Reuss. Certainly, there were vocal elements. In the early stages of the Council on Environmental Quality, I remember several meetings with them when [Russell] Train was chairman—discussions about the Cross-Florida Barge Canal and other projects. This was more in terms of discussion. Senator [Edmund] Muskie is the only one I remember particularly, because I participated in several hearings before his committee.

Q: Did you feel that he had much of an understanding of the Corps? Was he taking an adversarial position?

A: No. Actually, in the dealings that I had, he was trying to use the Corps, which he characterized as being responsive to environmental concerns, as a "club" against the AEC [Atomic Energy Commission], whom he couldn't get to take the same attitude.

- Q: Do you recall much about the emergence of the Institute for Water Resources [IWR]?
- A: Yes, in general, although actually I had very little to do with that directly. The idea had been developed and was handled primarily between Koisch and General Clarke. The development of the institute and the combination of various activities affected were just starting. As initially envisioned, it was designed more or less as a long-range planning group.
- Q: Did the institute, to your knowledge, get involved much in policy writing?
- A: I don't know.
- Q: What about the Engineer Study Group? Are you familiar with that?
- A: It had already been established. It was active and was used in many of the long-range studies carried out as a part of our military planning. At the same time, it operated primarily under the military operations group led by General Ploger.
- Q: In his interview, General Wilson stressed what an important capability it was for the Corps to have this type of group.
- A: It was well received throughout the Army. It had very close contacts with the Army staff and was a visible and viable source of Corps' input to many studies carried on by the Army staff.
- Q: Did you have much dealing with Joe Tofani?
- A: Yes, particularly through the rivers and harbors board activity. As chairman of the rivers and harbors board, I reviewed all of the various proposed water resource projects. He was responsible for staff supervision of the planning function throughout the Corps.
- Q: You mentioned the Cross-Florida Barge Canal a couple of times earlier. Would you have any comments on the problems that you were having with that project?
- A: I think it was a desirable project. I don't share the feeling of disaster that was presented. I made a trip to the area. I looked closely at this "nature in the raw" that they called the Oklawaha River, which was essentially the source of water and the general trace of the canal. As far as I'm concerned, you couldn't do anything to make it worse, so I was personally disappointed that the project was canceled. However, I understand the political realities. It would have been a distinct asset to our inland waterway system. There's no question about it in my mind.

- Q: How do you feel about the Tennessee–Tombigbee which is more of an issue lately?
- A: I think it's of questionable value because we already have a water route, and the project's advantages are only those of shortening the route. In this day and time, costs are so outrageous that it does raise the question of the proper allocation of funding. On the other hand, because it's been started, I feel very strongly that it ought to be finished. I see nothing to be gained by stopping it. I think it was a viable project, but I think it was also a question of priorities in the current economic situation considering the cost increases that have come about. Certainly it is subject to legitimate question.
- Q: I wonder if you have any other comments about your experience in OCE, since your next assignment will take you out of OCE and will also be your last active-duty assignment.
- A: I alluded before to the fact that I went with General Clarke to his first meeting with Mr. [Winston] Blount, then the Postmaster General, when he began to talk about the Corps' supervising the great expansion of the facilities of the Post Office Department.
- Q: General Wilson claims some involvement in that too, as a retired officer who was a friend of Blount's.
- A: Yes, he knew Blount, and I expect that he may have guided Blount along that way. In our first conversations with him, we were receptive to the suggestion. As a result, I supervised the preparation of a booklet, which I'm sure you can find somewhere in OCE, on the possibilities of the Corps' taking on the responsibilities for managing construction of the Post Office Department. As I remember, it was about six months from the first contact until the next event occurred. We finally entered into an agreement to handle the function. Everybody was agreeable at the time, but then somewhere along the line the Office of Management and Budget got into the act. They were the ones who finally killed it. I think we had a service to give just as we had for NASA. Since I had been intimately involved in the NASA activities, I was in a position to speak from experience after doing work for another government agency. I felt that a satisfactory system could be established. As far as I know, it was a satisfactory arrangement during the few years it lasted.
- Q: Was it a matter of budgetary considerations that kept—
- A: I think the OMB, politically, didn't like the idea that the Corps of Engineers was expanding its sphere of activity. That's my impression based on what I've heard. I can find no logical reason for their position other than political [considerations]. The cancellation came after I left OCE.

Q: Is there anything else to recall from that period?

A: One interesting sidelight. When the fire in January 1967 killed three astronauts at Cape Canaveral, the NASA administrator came to General Cassidy for help because of our close association with NASA through the construction of its facilities. As a result of the congressional review of that disaster, in the 1968 NASA appropriation Congress directed the administrator of NASA to establish a safety advisory panel. This would be a group of outside experts who would analyze NASA's handling of risk and the risk assessment function and make an independent report to the administrator.

When he had to appoint this board, Mr. James E. Webb was somewhat at a loss to find people with experience in dealing with major projects who weren't already a part of the NASA program, either as NASA employees or as contractors with major contracts—and therefore with possible conflicts of interest. All of the aerospace companies were involved in the space program. In looking around, Webb asked General Cassidy, as Chief of Engineers, if he would suggest someone to be a member of the panel.



James Fletcher presents a NASA flag carried on the first Skylab mission, May-June 1973 to Lt. Gen. Carroll Dunn at his retirement as chairman of the Aerospace Safety Advisory Panel.

Because of my past experience in military construction and my past experience with NASA, General Cassidy suggested me, and I was appointed to the panel. This occurred

in the spring of 1968. I continued to serve on that panel until September 1973, even after I left OCE. In fact, I was chairman of the panel for the last two-plus years. Again, this was an outgrowth of the Corps' association with NASA. The association became a personal commitment as far as I was concerned. Toward the end of my service, this began to take something like 10 to 15 percent of my time, a major commitment, as the space program got very active in the last days of the moon landing and then later with sky lab.

Another of my functions during the time I was deputy resulted from my service in Vietnam. I coordinated the support activity of OCE and the Corps for the Vietnam effort. I kept fairly close contact with events over there and the requirements that were being placed on the Corps.

Q: Did you get back there again?

A: I was back one time because I served on a board to investigate some alleged misuse of construction funds in Thailand. And while I was in Thailand, I made a side trip back to Vietnam. This, if I remember correctly, was in late 1968. That was the only time I was back in Vietnam.

Q: Do you recall any of these individuals? Mark Gurnee?

A: Yes, Gurnee was in civil works, the director of operations for civil works. I'd known him for a long time.

Q: Was he there when you came? I mean, had you known him earlier?

A: I knew him when I was at the Waterways Experiment Station. We had considerable contact with his group on the plant account activities. He was also in OCE at the time I served as executive and as deputy.

Q: How about Barney Dodge from the Institute of Water Resources, or David Agerholme?

A: I had no direct contact that I remember.

Q: Your last active duty assignment was with the Defense Nuclear Agency as director. At that point you were promoted to lieutenant general. Was that—maybe not that specific assignment but that type of assignment—what you expected at this point in your career? Did you expect to stay longer in OCE as deputy?

A: It is pretty hard to say what my expectations were. I had served as deputy for about two years. I anticipated that General Clarke would serve out a four-year term, and I could well have served a similar four-year term. General Westmoreland was the Chief of Staff of the Army at the time. Since I had worked very closely with him in Vietnam, he was personally aware of my attributes and capabilities. It was my impression that General Clarke also had recommended to the chief of staff that an appropriate assignment be found for me that would provide for a promotion. General Clarke appeared to feel that was appropriate. He did not say much to me other than telling me that he had recommended me for promotion. What went on that resulted in my assignment to DNA, I don't really know.

I met General Westmoreland in the hall of the Pentagon one day, and he said, "I've been looking for you." Then he said, "just nominated you for a promotion to lieutenant general and to be the head of DASA." I said, "What's DASA?" (It was called Defense Atomic Support Agency at that time.) He caught me so by surprise that I really didn't

correlate the two names. That was how I found out about the assignment and promotion. What went on in the background, I'm not sure. It was not too unusual for an engineer to have that assignment since General [Leslie] Groves had been the first director of the Armed Forces Special Weapons Project, later called DASA. Then shortly after I got there, it became the Defense Nuclear Agency.

It was a challenge and an opportunity and, while I hated to leave the Corps, I realized that my period of service was getting short. Incidentally, just before this time, late July 1971, I believe, I had had an offer from Con Edison to retire and go to work there. I had turned it down. When the assignment to DNA came, I remember thinking that I had made the right decision staying in the Army, and I appreciated the opportunity both for the promotion and to take on an organization of my own. All in all, it was a welcome assignment.

Defense Nuclear Agency, 1971–1973

Q: What was the agency's mission?

A: It has basically three missions. One, and probably the primary mission, is testing of nuclear weapons effects on people and equipment. It has a radiobiological laboratory as a subordinate organization, located at Bethesda [Maryland], which carries out nuclear effects tests on animals and sponsors other studies of nuclear effects. It also does a lot of detailed research in all phases of the effects of a nuclear explosion, whether it be on equipment or on people. DNA is responsible for setting up and carrying out tests to determine the effects of nuclear radiation on new weapons; for instance, determining how a new warhead is affected by radiation from a nearby nuclear explosion. The underground testing at the Nevada test site is a major activity. DNA has a field organization at Albuquerque, New Mexico, that carries out these tests. DNA is also responsible for maintaining a capability to reinitiate atmospheric testing of nuclear weapons using the facilities at Johnson Island in the Pacific. So weapons effects testing is one of its major activities.

The second mission is, in effect, to keep an accounting of all atomic weapons regardless of which service stores them. No weapon can be moved without orders from the Defense Nuclear Agency. This provides a centralized accountability for all nuclear weapons. It also involves inspecting for security and storage on a worldwide basis.

The third mission is the interface with what was then the AEC, now the NRC [Nuclear Regulatory Commission], as to the annual requirements for nuclear weapons for the services. This is done in coordination with the Joint Chiefs of Staff and the Assistant to the Secretary of Defense for Atomic Energy. They are the action agencies.

Those were the three major activities, including, of course, dealing with all the services on nuclear weapons requirements and availability. The biggest engineering mission involves the physical problem of preparing for the underground tests. Some pretty massive tunnels have been built to ensure against atmospheric release of radiation from the tests.

Q: Would that have involved much work with the Corps?

A: A limited amount of work with the Corps. This work was contracted using primarily the contractors used by the AEC at the Nevada test site. We entered into our own contracts as well.

Q: Did you use anybody that you had worked with earlier—get them transferred to DNA?

A: No, I'm not inclined to carry a lot of people around. On occasion I have, but for the most part, unless it was an emergency, I would tend to let the system work and go with that.

Q: Did you find that happening to you?

A: So far as I know, every assignment that I held after June of 1942, when I was assigned as executive officer, 303d Engineer Battalion, 78th Division, was in response to a request. I left the 78th in November 1942 to go to the 30th Infantry Division in response to a name request. I believe every assignment that I had from there on for the rest of my career was based on a "by name request." I'm not sure if that's good. But, nevertheless, that seems to be the way it worked for me.

Q: Why might it not be good?

A: I can't say that it hurt my career, but whether it was the best thing all the way through for the Army I'm not sure.

Q: I'm wondering if you feel that you've said as much as you'd like to about your time with the Defense Nuclear Agency. Was that clearly your last assignment when you took it?

A: Well, yes. This was during the latter stages of Vietnam, and the chief of staff established a policy—I don't know when it was established—but I know it was in effect after General Westmoreland took over as chief of staff. Any appointment of an officer to a higher grade than major general, which is the highest permanent grade, carried with it an agreement that said appointment was for a specific assignment; there was no guarantee that there would be another equivalent assignment when that one was over.

Therefore, either you would voluntarily retire when the commitment was over, or you were prepared to go back to your permanent grade if you didn't retire. I responded to the chief of staff's letter quoting this policy by saying that, when that assignment was over, if the chief of staff (or his successor as chief of staff) felt that there was no appropriate assignment, then I would voluntarily retire. That would have been in the summer of 1974. In effect, I retired about ten months earlier than would have been a normal completion of tour.

I did it because I knew that this was my last assignment. And, again, Con Edison had approached me to become their vice president of construction. They were very anxious to start a major pumped storage power plant. Since I had had some experience with hydropower plants in the Southwestern Division, they thought that experience would be useful to them. In order to meet their schedule I had to decide to retire by 30 September 1973, which I did.

Q: How did you first come to Con Ed's attention? They had been seeking you earlier.

A: Back as early as 1971 I had been approached by them. Then, in the spring of 1973, realizing that within a year I probably would retire, I began to explore some possibilities, including several in Texas. Apparently, they heard that I might be available and approached me again.

The actual contact by Con Edison was through another Corps of Engineers officer, Bill Lapsley, who had retired from the Corps as a major general. He had become involved with Con Edison, because Charles Luce, the chairman of Con Edison, had previously been the head of the Bonneville Power Administration in the North Pacific. While there, he had known Lapsley, who was at that time North Pacific division engineer. Luce later became the Deputy Secretary of the Interior in the Kennedy administration and then went from Interior to Con Edison to be the chairman and chief executive.

Shortly after Luce came to Con Edison, he found a very unfavorable situation in the company and felt strongly that it was necessary to make major changes in key positions. He began to look around for people that he knew had strong management qualifications. One of the people he recruited was Lapsley. There were also several other engineer officers who had retired and gone to work there. He had also brought in people from the Atomic Energy Commission and several other government agencies. He was looking for experienced managers who could go into relatively high positions as he reorganized and rearranged the company to suit his requirements. It basically, then, was because of Lapsley, because we had served on the rivers and harbors board together and he was aware of my activities and background. He was the principal agent in bringing me in. Lapsley later became the president of Con Edison, retiring from that position in 1975.

Military Retirement, 1973, and Retrospection

Q: When you finally retired from the military service on 1 October 1973, and reflecting from the present, how did you feel about the way your career had gone in the military? Were there any major things, or even minor things, that you had hoped to do that you had not been able to do in the way of assignments?

A: Oh, obviously I would have loved to have been Chief of Engineers, but not everybody can do that.

Q: Was there a particular time when you felt that might have been a possibility?

A: There were only two times that would have been possibilities. I would have been a competitor of Clarke's and a competitor following Clarke. However, I would have been a little old at that time. So I was not surprised by what happened and had no objections, and found no fault with those chosen. Other than that, I can't really say that I have any regrets.

Q: Do you have a favorite assignment of all those that you had?

A: I expect, in the time frame in which I had it, the assignment I look back on with the greatest degree of satisfaction, all things considered, was the assignment as director of the Waterways Experiment Station. This put me in charge of a major activity at a relatively young age in an area that I knew well. It was an assignment that I thoroughly enjoyed.

Q: Would you have some general reflections about your engineering experience as a whole? You made the decision as to a career when you finished your undergraduate education, this rather than making it before you started school. Instead of going to West Point, you had gone to the University of Illinois. You had considered several offers from industry at that point—had even accepted one job—and then when there was an opportunity for a commission, because the Army was seeking engineers from civilian life, you had taken advantage of that. How did you feel about your choice?

A: I don't have any regrets. I think that in the outcome of events I've been extremely fortunate in the decision to go in the Army. One factor to remember was my feeling that something was going to happen and I would be in the Army anyway, so I might as well go in to start with. Maybe it was not quite as calculating as that might sound, but nevertheless that was part of my decision. Obviously, as events turned out, things got very active. There is certainly no question that had I not gone in the Army in 1938, instead of being a battalion commander in World War II, I would have probably been a platoon or company commander called up as a Reserve officer. Certainly, my civilian

life, whatever it was, would have been disrupted. Again, there's nothing wrong with that. I'm simply saying that I had the choice of making the Army a career or making civilian life a career, with a strong possibility for the disruption of civilian life. I chose under those circumstances to make the Army a career. I'm trying to make the distinction between the fact that it wasn't that a war appeared to be coming and I wanted to be ahead of the game, but that I figured that I was going to be in the Army sooner or later anyway—so I might as well decide to start with the Army as a career instead of having it disrupt another career.

Events proved that I made the right decision. I don't believe that I would have wanted to be in the Army in any branch other than the engineers. Although I've had several important non-engineer assignments, which I enjoyed and found to be a challenge, as a whole I wanted to be closer to an engineering career. It was the opportunity for a commission in the Corps of Engineers as well as in the Army that made the choice attractive.

I have enjoyed all of my assignments and gained from them, so I don't look back on my career with any regret. I feel very fortunate that I have had many opportunities. What may have seemed to be minor events have helped shape my career. Some examples were the WES anniversary celebration, which brought me to the attention of General Sturgis, and the OCE service, which acquainted me with many key people. There's no question that that played a part in my career advancement and in the assignments I've been given. I really don't feel that I could have made a major improvement if I had been free to choose my own assignments.

Q: What about troop command?

A: Well, I had troop command my first seven years up through battalion command in wartime. Frankly, after you command a battalion in wartime, no other troop command makes any difference. That's the command! When you get above that, you don't have the same relationship. The difference comparing my case to a current career—say, the career of my son—is that I got a tremendous amount of experience in a very short time. This was because of the time frame in which I came along. He (my son) will undoubtedly learn more in longer term assignments and individual assignments, but he won't have the opportunity for the wide diversity of assignments that I had. Each of us is a product of the times in which we live, and, rather than serving in three wars, as there were in my career, I hope he has had his war experience in Vietnam with no more in the future.

Q: He's in the engineers, is he not?

A: Yes.

Q: Did you encourage him to go in?

A: I was surprised when he said he wanted to go to West Point, but was glad to help him get an appointment when I became convinced that he really did want to go.

Q: Was the Corps of Engineers the place that he was heading for?

A: I don't know. He made the choice.

Q: I could ask him.

A: I'm glad he made the choice, but it was totally up to him.

Q: I want to ask you, too, about some of your activities since leaving the Army. Maybe we could start by recalling something you mentioned a while ago when we weren't taping. You stressed that you learned as an engineer, in your Corps experience, how to use persuasion rather than to rely on the idea that because someone was a general officer, all they needed to be able to do was issue orders. Could you comment a little bit on that in relation to a business career?

A: There is no question that there is very little place for despotic activity in business life. There is even less in the Army, for that matter, although some people do display these characteristics, possibly not so much now as in times past. There are also despots in business, but they started out as entrepreneurs or owners of companies and continued to head their companies. But, basically in business—in a major company—you're dealing with equals, and you are dealing with people who are not in the habit of jumping when somebody yells, "Jump!"

The Army really gives an opportunity to show what I consider to be appropriate leadership. I feel that the Army gave me experience in leadership, particularly in some of my assignments involving essentially civilian organizations. The Waterways Experiment Station and the Southwestern Division gave me this opportunity to work with people other than in a close-knit military discipline.

The combination of that experience along with Army training in leadership taught me how to get along with people and how to influence people to work cooperatively toward mutually desired results. For these reasons I feel that, contrary to some thoughts about the "military mind," the military is a very good source of training in how to deal with people. In many cases, surprisingly, I find that to be a deficiency in business life. I find too many people in top-level positions who really don't know how to get along with people and how to lead people or to work with people. They are not

at ease in such circumstances. And yet, I find some of these people in pretty high positions.

The other thing that I have found in business—and it has been somewhat of a surprise—is how much the business community could learn from the services about how to do proper staff work. I’ve found it very difficult to get someone not trained in staff work to know how to assess a situation and how to put it down on paper to reach a logical conclusion as to a final decision. [People who lack a background in the staff work] just do not seem to have the training to complete the process. As a result, they are much more concerned with trying to figure out ahead of time what answer you want. Then they try to write something that justifies that answer rather than seeing the need to assess the situation—its various components and the alternatives—and then coming to a logical, well-supported solution.

In response to the question of differences between military service and civilian life, the thing I’ve noticed most is the lack of well-qualified people to do what I would call quality staff work to help arrive at logical decisions. I’ve heard other people say the same thing, but this I have noticed particularly.

Consolidated Edison Company, 1973–1980

Q: Your first post-Army position was with Consolidated Edison Power Company?

A: Yes, I became vice president of construction, primarily to start the pumped storage power plant at Cornwall [New York]. There was also other construction—a \$600-million-a-year construction program; certainly a major program for a private company. We started Cornwall construction but were stopped by court order based on a suit by environmentalists. It is still in court, although the project has been abandoned. I think it was a very poor court decision, and New York is worse off as a result. They are going to pay more for their power needs without it. It would not have been environmentally damaging. Nevertheless, one cannot undo what has happened.

After I had been with Con Ed about ten months, I became senior vice president with responsibilities for environmental affairs, engineering, and construction. You can see that this was a very close parallel to the Corps of Engineers’ responsibilities of a division engineer or deputy Chief of Engineers. This assignment was in line with plans laid out when I first talked to Luce and Lapsley. They wanted to make this combination assignment when it became appropriate.

Before I joined Con Edison, while being interviewed, I specifically asked the chairman why he was interested in a 57-year-old man in this field. His quick answer was, “For

two reasons: one, I need someone who has the expertise and the knowledge that can do the job we have now. I also need someone who can train others coming up to take over when he leaves. That is the reason I'm more interested in a 57-year-old with the experience you have than I am in a 45-year-old who may already be here but not have that experience. There is a gap that I want to fill, and you fit it." I feel that I was able to accomplish what he wanted in the seven-plus years that I worked for Con Edison.

Q: And that environmental issue with the Cornwall project was a major event during your time?

A: Oh, yes, but there were other environmental issues such as nuclear power plant completion, and after completion, its effects on the Hudson River. We made multi-million-dollar studies of biological activities in the river.

Q: How would you characterize your attitude toward the environmental movement in general?

A: Pragmatic. I believe environmental factors are important, but that we have gone totally overboard. The government has gone absolutely crazy in issuing regulations and instructions, lacking a basis for many of them. We have gotten too emotional about the environment. While I think we can make major improvements, say a 90 percent improvement in air and water quality, we're throwing billions of dollars away trying to get a few percentage points above that in both mediums.

Having experienced both cancer and bronchial asthma, I have no sympathy whatsoever with the people who say we can have wholly pristine air, and any substance that presents the slightest risk of creating cancer in animals must be abandoned. I think that is a very stupid and unrealistic approach to life. I feel very strongly about this even though, as I say, I have suffered from both cancer and bronchial problems. There are no absolutes. We add to our costs, we add to inflation, and we add to over-regulation through some of our attempts to bar chemicals and other emissions that have a tremendous benefit for improving the quality of life. We need to do some balancing between values. That, is my point of view.

I see no necessity for every body of water being fit for fishing and swimming. I just don't see any justification for it whatsoever. There are other things in life that are also important. Certainly, I also feel very strongly that every body of water should not be a cesspool either.

Q: So it's a question of—

A: Balance. In general, I agree with the current administration's approach to things. I consider myself to be an environmentally sensitive person, but not rabid on the subject.

Q: And how environmentally sensitive do you think the Corps was before the late 1960s?

A: It was never called that, but I don't think that the Corps was involved in a rape of the countryside. On the other hand, they were not particularly sensitive or overly inclined to give environmental questions too much attention. They had a job to do and they did that job with as little destruction to the other elements as possible. If you had to dump dredge spoil, you dumped dredge spoil. And it was more likely dumped where it was economically desirable to do so than where it would not affect wildlife. On the other hand, some of the best wildlife habitats grow out of dredge spoil areas. In many cases there was a balance that came about accidentally. We may not reach the same situation when we try so hard to assure it ahead of time.

The Business Roundtable, 1980

Q: Now you went from Con Edison to the Business Roundtable?

A: Yes.

Q: Would you like to say a little bit about your job; at least what influenced your decision to take on this project?

A: The Business Roundtable is an organization formed in 1972, made up of chief executive officers of major companies. Its purpose is based on the belief that business executives should take an increased role in those things that affect public policy and public interest—because business interests must parallel the interests of the American people. They also feel that business leaders must speak as individuals but that they also have responsibilities, collectively, to the nation.

One of the activities that the roundtable has sponsored since its founding has to do with construction problems. All major corporations are involved in some form of construction either for themselves or for others. What is now the construction committee of the roundtable has existed since before the roundtable was formed. It has been concerned primarily with productivity in the construction industry. In 1978, the committee initiated a study to determine the major problems in the industry and what could be done about them. A small group of people from the construction committee developed an outline plan for a detailed study of construction problems. They came up with about 27 specific problems divided into five major areas. These major areas were project management, construction technology, labor effectiveness, labor supply and

training, and codes and regulations. Under these general topics there were multiple problem areas.

Having developed this general scope for a detailed study, they went to the policy committee of the roundtable in November 1979 and asked for approval for a long-range study to find answers. They also asked for the roundtable's commitment for both funding and for action to back the project. They envisioned a four-phase study, the first of which was really the development of the outlined scope. The second phase was detailed research and investigation of each of the problems, together with proposed solutions. The third phase was the development of a coordinated plan for implementation of the recommendations that grew out of the second-phase study. And the fourth phase was to be an extended period of implementation of the recommendations.

They envisioned three to five years to complete the project, starting in 1978 and going on for a period of time. The second phase, the research phase, would be the major activity and would require about two years. Since the committee and the members of the task force appointed to carry out what they called the Construction Industry Cost Effectiveness Project were all people who held positions in their individual companies, they found it necessary and desirable to have a project director. They wanted someone who was experienced in and known to the industry, and who would provide essentially full-time direction and guidance to the project, coordinate the development of a series of reports, and begin a plan for implementation.

This was the background, of which I knew little until mid-January 1980. I received a call from a contractor friend of mine who was serving as an intermediary for some of the members of the construction committee task force. He approached me as to my interest in the job of project director. When I discussed it with him, which as I said was my first exposure to the subject, I told him that I was actively engaged. I intended to stay with Con Edison until my normal retirement date at age 65, in August 1981, and then planned to retire to Pinehurst, North Carolina, and continue to enjoy life. For that reason, I was not available and was not particularly interested in considering the job. However, he urged me to look into it more carefully and also urged that I talk to some of the people directly involved.

Somewhat reluctantly I did so. Later I had a meeting with three of the people involved. They were serving as a search committee looking for a project director. We talked at some length, and I learned more about the project and the challenge. I was particularly impressed by the fact that this prestigious organization had committed itself not only to making the study, but to making a detailed plan and continuing to support it until something happened. In other words, it was not going to be just a study to be put on the shelf. It was to be an active and continuous effort to implement the results of the

study. This was intriguing. Also, with 40-odd years in the construction industry, I was quite aware of some of the problems. This presented a challenge to see if I could be a part of an organization that maybe could bring about some improvement in the cost-effectiveness or improving productivity, of the industry as a whole. They were not looking at just what the individual workmen on the site could do in terms of productivity improvement but at the total picture—better management, better planning, better design, and better execution in every way.

As I thought more about it, it became more intriguing. When they came back about a month later, after they had had a number of other interviews I was informed that they would like very much for me to take the job, I placed two conditions before I would make any favorable response. The first was that they arrange with Con Edison for me to continue my association with the company until I reached the normal retirement age. (This was because of current benefits from Con Edison employment and also because it would result in material benefits after retirement.) These benefits would be lost if I left Con Edison prior to the time I reached retirement age.

The second condition that I imposed was that it not be necessary for me to conduct the activities of the project from New York. Therefore, when the time came that I severed my active association with Con Edison, I was free to leave New York even though I continued to direct the study.

They accepted both of these conditions and worked out an arrangement with Con Edison that reimbursed Con Edison for my salary and a portion of my benefits. Con Edison saw fit to continue our relationship and continued to provide certain medical insurance and other benefits as part of their contribution to the study. On the 1st of May 1980, I began full-time work on the study, having taken a leave of absence from Con Edison.

At that time, there were about 50 people involved in the project. We now have more than 250, representing over 126 different companies and organizations engaged in a very detailed look into 23 specific subjects (having been reduced from the original 27 subjects), for which we will complete individual team reports on each subject about the end of 1981. This will be followed by a comprehensive report on the overall study. At the same time, we will proceed with planning for the implementation phase that will follow, starting approximately the 1st of July 1982. Having already spent about 15 months on the project, I will continue full-time work on it for the remainder of 1981 and at least until we finish the individual team reports.

Starting in 1982, I plan to spend something less than full time, probably down to about half time by mid-year of 1982, as we proceed with the completion of the comprehensive report and the implementation plan and begin implementation. This will follow for

several years ahead. This does give me an opportunity to move gradually into retirement activities. It feeds upon my 40-odd years of experience in the construction industry, and gives me an opportunity to meet some very dedicated people who are working in the industry. Also, it supports the very deep commitment that these people and their organizations have to this multi-year, multi-phase, multi-million-dollar project. I have high hopes that we will have a major effect in changing the industry for the benefit of the economy and everyone engaged in the industry. I truly believe that our goal of appreciably increasing the amount of construction for the dollar will be realized, and our estimate of saving about \$10 billion annually in the national construction program is achievable.

The dedication of the people involved has been phenomenal. These people give from 10 to 40 percent of their time to the study. Their companies pay their expenses and their salaries and donate their time, so that the direct expense of the study essentially is limited to project direction, administration, certain meeting expenses, and some consultant services. We have used a number of universities and university people to make specific detailed analyses of individual subjects.

For the most part, each person is an expert in the field he is studying, so we are getting the broadest possible experience level. A team of five to ten people study each specific subject, and the results of that study should be the best analysis of that problem and its possible solutions that is possible in the current time frame. It is a real challenge and one that I am enjoying and looking forward to continuing over the next 18 months or so as the project is completed.

Q: What other things do you anticipate doing with the other 50 percent of your time, once you get settled in North Carolina?

A: Enjoying life by playing golf and traveling.

Q: You've picked a place for golf?

A: Yes, and for relaxing.

Q: Good.

A: Forty-three years is approaching, and it will be about 45 by the time I hang it up.

Q: Do you have any other observations you'd like to make as we end the interview? Anything you feel was omitted?

A: I can't see how we've omitted anything in the details we've covered. I must say that I'm in phase with the current administration. I'm very hopeful that some of the excesses of the past can be corrected and that the country can get back on the beam—not just in environmental affairs, but also in terms of the economy. I'm hopeful about a resurgence of—call it patriotism or whatever—some degree of disciplined approach to life and finding meaning for things that will make this country an even better place in which to live than it has been in the past.

Also, I feel that this study is coming at a very opportune time; that there is a climate that will help some of these things take place. Something that started in 1978 is going to mature in a very favorable time frame in terms of acceptance. I'm sure that some of our recommendations, under other administrations and [in other periods of time] would not be as welcomed. So that is a part of my optimism, that we can actually have some effect. Thank you.

Q: Well, I'd like to thank you for a very interesting and informative interview. I certainly appreciate your time.

A: Well, this has been some experience. I don't know as I have ever sat down for this long and talked about myself.

This is the end of the interview with Lieutenant General Carroll H. Dunn, U.S. Army retired. The final session was conducted on 28 July 1981 in New York City.

Epilogue

At the completion of the interviews in 1981, General Dunn was the project director of the study of problems in the construction industry and possible solutions supported by the Business Roundtable.

Following completion of the study and publication of the results, he continued as a consultant to the Construction Committee of the Business Roundtable, primarily in activities to bring about implementation of the study's recommendations within the industry. His involvement continued until November 1988.

A major recommendation of the Construction Industry Cost Effectiveness Study concerned the need for continuing research and study of the construction process. As a result, the Construction Industry Institute [CII] was established in 1983 at the University of Texas at Austin. General Dunn was instrumental in its establishment and early direction of its efforts. His association with CII has continued on a limited basis to the present [1997].

The Carroll H. Dunn Award of Excellence has been established at the institute to recognize an individual who has had singular and notable responsibility for significant advancement in improving the cost-effectiveness of the construction industry. Also, CII has established in the College of Engineering at the University of Texas the Carroll H. Dunn Endowed Graduate Fellowship in Engineering.

In February 1995 General Dunn was the recipient of the Chief of Engineers Award for Outstanding Public Service.

In February 1998 General Dunn was elected to membership in the National Academy of Engineers.

Following retirement from Consolidated Edison Company and while still involved with the Construction Industry Cost Effectiveness Study, he and his wife Letha moved to Pinehurst, North Carolina, in August 1981. Since 1988 he has been active in community affairs, primarily involving the Pinehurst Members Club and the Village Chapel.

In April 1996 they moved to The Fairfax, a retirement community near Fort Belvoir, Virginia.

Acronyms

AEC	Atomic Energy Commission
BERH	Board of Engineers for Rivers and Harbors
CEBMCO	Corps of Engineers Ballistic Missile Construction Office
CERL	Construction Engineering Research Laboratory
CICE	Construction Industry Cost Effectiveness Study
CII	Construction Industry Institute
DASA	Defense Atomic Support Agency
DNA	Defense Nuclear Agency
DOD	Department of Defense
EAB	Environmental Advisory Board
GARIOA	Government and Relief in Occupied Areas
GHQ	General Headquarters
ICAF	Industrial College of the Armed Forces
IG	Inspector General
IWR	Institute for Water Resources
JCS	Joint Chiefs of Staff
MACV	Military Assistance Command, Vietnam
MRC	Mississippi River Commission
NASA	National Aeronautics and Space Administration
NCO	Noncommissioned Officer
NRC	Nuclear Regulatory Commission
NYA	National Youth Administration
OCE	Office of the Chief of Engineers
OMB	Office of Management and Budget
ROTC	Reserve Officer Training Corps
USARV	U.S. Army, Vietnam
WES	Waterways Experiment Station

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